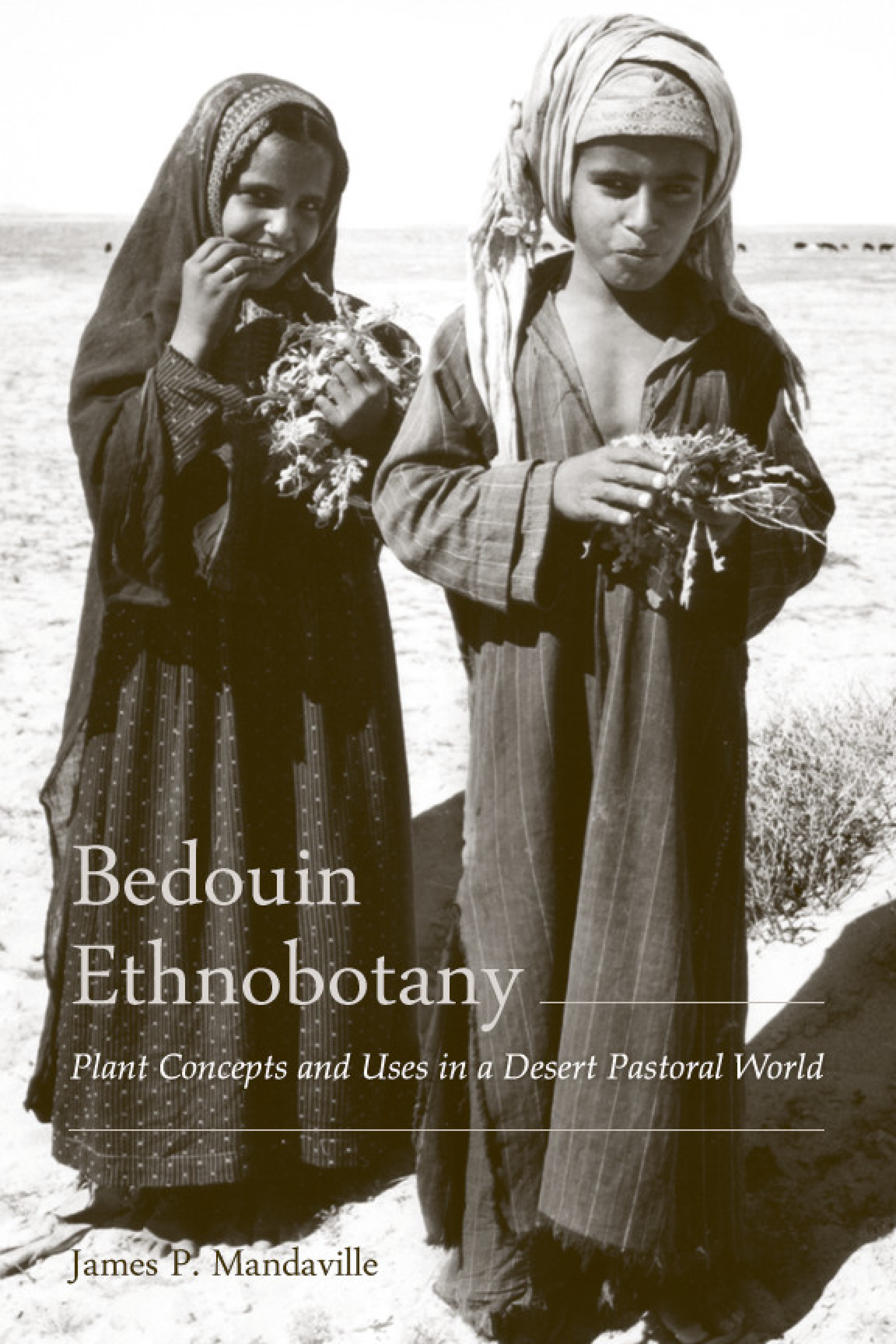

Bedouin Ethnobotany

Plant Concepts and Uses in a Desert Pastoral World

James P. Mandaville

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JAMES P. MANDAVILLE

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To Kevin, Riki, and Peter, who have traveled these lands
And to Ike, who someday might

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Preface

I have to slip into a bit of personal history to explain how a study like this comes crawling out of forty years' woodwork. I began collecting Bedouin Arabic plant names and plant-related terminology in the early 1960s when I worked for the Arabian American Oil Company at Dhahran, Saudi Arabia, as a practical Arabist attached to the company's Arabian Research Unit. This unit was an academic-style research group, part of the company's Government Relations Department, set up to help interpret Arabian geography, people, customs, and language for its then all-American management. It was an organization in many respects unique in the business world at the time. Several areas of work took our small group into active contact with the Bedouin population of the kingdom. We did stints in remote desert areas, such as along the Trans-Arabian Pipeline across northern Arabia, where the population was made up almost entirely of Bedouins. On "field relations" assignments, we negotiated with herders over the value of camels lost in oil field sumps (these camels were somehow always pregnant females of the most highly prized breeds). Our Research Unit's office was based in Dhahran, and we generally gained more "field experience" by bringing to ourselves members of various Bedouin tribes whom we hired as part-time "relators," the term *informant* being thought stigmatized by intelligence-gathering connotations. (Looking back now, I wonder if the term *relators* was chosen by our early chief, the Arabist and historian George Rentz, as a conscious translation of the early Islamic word *rāwī* that I describe in chapter 7.) At the same time, we scrounged field trips with better-equipped company departments, such as the oil-exploration crews, or, often in my case, took to the desert ourselves on weekends with our personal Land Rovers and Bedouin acquaintances as guides.

We were encouraged to collect all kinds of information about the tribes in whose territory the company carried out its operations. We were the corporate authority, along with the Law Department, on the boundaries

of Saudi Arabia. These boundaries, many of them then still undemarcated and in active dispute with neighboring states, were of vital interest inasmuch as in many cases they legally defined the company's oil concession area. International boundary claims in lands with a nomadic population often revolved around traditional tribal grazing ranges and the distribution of tribal "home wells." Which state's tribes grazed where, and who, by long practice and tradition, "owned" what water wells? At the same time, we were charged with providing place-names, both in Arabic and in standardized transliteration, for Saudi Arabia's first nationwide series of aerial photo-based maps. We worked over the data bit by bit with a roomful of Bedouin consultants chosen for their knowledge of each geographical area.

As I worked day to day with these masters of desert lore, the Bedouins, I noticed that they often used the names of plants in describing the boundaries or characteristics of different geographical areas. Their version of geography sometimes seemed to involve as much botany as topography. Having something of a penchant for natural history, I began collecting the Bedouins' names for plants and tried to learn the plants' scientific identities with available references, which for Arabia were preciously scant in those days. I built up, alongside my other duties, card catalogs of Bedouin plant names and vegetation terminology. I took a correspondence course in plant taxonomy, read taxonomic textbooks, and exchanged letters with European botanists with Middle East experience. In addition, I collected in my spare time several thousand plant specimens for herbaria such as that of the Natural History Museum, London. These specimens, which in part constituted vouchers for vernacular names, formed the basis for a standard taxonomic flora of eastern Saudi Arabia (Mandaville 1990). At one point, I began drafting a paper to be titled "Bedouin Concepts of the Plant World," but I filed it when the Research Unit was shut down and its staff dispersed. I became occupied in more mundane aspects of oil company work.

Sometime around 1975, I came across a review of Brent Berlin, Dennis Breedlove, and Peter Raven's now classic book *Principles of Tzeltal Plant Classification* (1974). Open-mouthed and wide-eyed, stumbling a bit through the unfamiliar jargon, I marveled at how these authors had done with the Tzeltal-speaking people of southeastern Mexico just what I had once thought of doing with the Arabic-speaking Bedouins of east-

ern Arabia. But they had done it in an incomparably more complete and theory-based manner. Poring through the references in this work, I discovered that a theoretical base for folk classifications study had been developing over some twenty years, and I scrambled to catch up.

I think of this foray into Bedouin Arabic plant lore as the long-delayed joining of two loves: the desert-adapted plants of Arabia and the remarkable people who have followed them, prayed for their germination, named them, and depended on them for their livelihood for thousands of years.

Acknowledgments

I owe thanks, first, to the University of Arizona faculty in the Graduate Interdisciplinary Program in Arid Lands Resource Sciences, in particular former members of my dissertation committee headed by Suzanne Fish and including Michael Bonine and Steven McLaughlin, whose encouragement and critique were more valuable than they probably realize. Cecil Brown, professor emeritus, Northern Illinois University, generously read and commented on a draft of chapters dealing with folk classification. His suggestions led to some changes that improved the text. Muhammad Tahlawi at Dhahran, Saudi Arabia, provided valuable checks and comments on several linguistic points. Discussions with Geraiyan Al-Hajri clarified some issues of folk classification. Waleed al-Sudayri helped greatly in interpreting the song in the CD sound file. John Pratt facilitated late contacts that plugged data gaps, and Greg Dowling led me to economic statistics. Helpers on the botanical science front were numerous, but I must mention the late Dorothy Hillcoat at the Natural History Museum, London, Ian Hedge at Edinburgh, and Tom Cope at Kew. Angie Hall was generous in allowing use of her drawing, and I thank the Saudi Arabian Oil Company (Saudi Aramco) for use of two photographs and two figures. Two anonymous reviewers provided, with encouraging remarks, corrections and suggestions that enhanced the package. Allyson Carter at the University of Arizona Press was most helpful and encouraging from the beginning, and the sharp eyes and wide knowledge of my copy editor, Annie Barva, often showed how things could be done better. Nancy Arora provided instant responses and constant good humor through the editing and production process.

My debt to my Bedouin consultants is of course enormous. The names of the most important of those contributors are listed near the end of the introduction.

Bedouin Ethnobotany

Introduction

I.1 Scope, Previous Work, and Research Chronology

MORE THAN ONE UNIVERSITY professor of linguistics has gently let me know that my affair with Bedouin Arabic plant classification "falls a bit behind the cutting edge of linguistics studies these days." Methodology and interests in the larger discipline have indeed changed since William Sturtevant proclaimed "the new ethnography" and told us that "a *culture itself* amounts to the sum of a given society's folk classifications, all of that society's ethnoscience, its particular ways of classifying its material and social universe" (1964, 100, emphasis added).

I doubt that anyone believes this today. But even by 1964 one aspect of ethnographic semantics—that concerned with humans' conceptualization of their living natural world—was in fruitful development as part of efforts to discover what was common in this domain to many societies and languages. Over the next fifteen years, it was given a great impetus by the impressive work of Brent Berlin and his colleagues. My remarks in the preface of this study indicate what effect that work had on me.

The fields of ethnobotany and ethnozoology, traditionally concerned almost exclusively with a society's *uses* of plants and animals, have only relatively recently expanded their interests to the conceptual and classificatory. In more recent years, textbooks in these fields (e.g., Martin 1995 for ethnobotany) have begun to deal with folk classification as an essential aspect of fieldwork. By the 1980s, it had already begun to figure in applied anthropology, perhaps through its good fit with the focus in international aid work on "bottom-up" development. Here, some workers have begun to emphasize the importance of an understanding of folk classification systems along with broader concepts of nature as a base upon which to build successful approaches to the use of land, plants, and animals (Brokensha, Warren, and Werner 1980).

The aim of this study is to provide, within the limits of my data and experience, the full extent of the relationship between the Bedouins

of eastern and northeastern Arabia and the plant life of their hyperarid homelands. Given the virtual absence in the literature of descriptions of plant classifications among Near Eastern pastoral nomads—indeed, the scarcity of such data on pastoralists in general—I give primary attention to this aspect. I describe plant uses first, however, because I feel that an understanding of that side provides helpful background for a better appreciation of some points of classification.

My approach to describing the Bedouin Arabic plant classification scheme is one that has become almost standard in recent years: I compare it with the terminology and framework employed by Brent Berlin and associates, which I describe, with other developments, in the early part of section 5.3. My data from pastoral nomads have raised some anomalies with respect to that model, and I attempt to explain these anomalies in terms of the desert environment and some utilitarian factors associated with camel pastoralism.

I have not been able to find in existing literature any account of Bedouin Arabic plant classification or, for that matter, of any such classifications by any other Arabic-speaking groups in the Arabian Peninsula or North Africa. Joseph Hobbs's (1989) very useful account of the natural history (including plant names and some uses) of the Ma'az Bedouins of Egypt's Eastern Desert provides a tabular classification of the animal kingdom among these people, who had emigrated from the northwestern Arabian Peninsula some two to three hundred years earlier. His list of plant names is fascinating in its obvious close similarity to Najdī Arabic material, but it deals only with basic-level names (folk generics). There is, of course, a varied trove of Bedouin plant names scattered through the European travel and memoir literature. Beginning at least as early as the 1876–78 travels of Richard Burton in Midian and Charles Doughty in the Hijaz and northern Najd (not to speak of the eighteenth-century Niehbur expedition to Yemen, which lies outside the linguistic area covered here), it was Western travelers' custom to take note of the Arabic names of the more conspicuous plants and animals they encountered. Some of the more scientific-minded brought back plant specimens for herbarium identification (e.g., Burton [1879] 1984; Philby 1922, 1933; Cheesman 1926). Western travelers or residents more fluent in Arabic and with more Bedouin experience, such as H. Saint John Philby and Alois Musil, picked up some of the more common Bedouin life form–level or intermediate-level

names. The annotated list of Kuwait plants by Violet Dickson (1955) is of this class, and her notes also describe uses of plants by Bedouins and townsfolk, all backed by specimens determined at Kew. By and large, however, such writers were content to collect at the basic name level and only sporadically.

In another category altogether are the several works of the Czech explorer and historian Alois Musil, whose accounts of his north Arabian travels between 1908 and 1915 have left us a wealth of geographic and Bedouin lore, often in astounding detail. Although his primary objectives were not ethnobotanical, he collected many plants with their Bedouin names, most of them identified scientifically through specimens studied by Josef Velenovsky. His material, in particular vernacular names and plant uses, provides a most valuable picture of Bedouin–plant relations at a time when the northern Bedouins were still untouched by the great political and economic events to follow later in the twentieth century. For my purposes, the most useful of Musil's works are *The Manners and Customs of the Rwala Bedouins* (1928a) and *Northern Neǧd* (1928b), the former being a broad ethnographic treatment of this important Najdī Arabic–speaking tribe. I refer to his material more explicitly in chapter 4, describing plant uses, where it provides a valuable comparative benchmark for my data of the 1960s.

Plant references in selected classical Arabic literature are discussed in chapter 7, where I attempt to provide a diachronic dimension by discussing Bedouin plant classification and nomenclature as it was some 1,100 years ago. My argument, made possible by a quirk of the methodology of the classical Arabic philologists of the eighth and ninth centuries A.D., is that the great majority of Bedouin plant names and categories used today are virtually identical with their usage more than a millennium ago.

Looking toward the possibility of discerning some common characteristics of the botanical folk classifications of pastoral groups in general, I have tried to discover, although not very successfully, classification accounts of other groups of this subsistence type. I turned up little comparative material beyond the very useful studies carried out between 1985 and 1988 by Bernd Heine, Ingo Heine, and their associates on plant classifications of pastoral groups in the northern border region of Kenya. I discuss and compare this material with my Arabic data in section 5.3.

I should point out, at this outset, one characteristic of my Bedouin Arabic data that might tend to be overlooked in later descriptive details: the fact that it was collected almost entirely in the period from 1960 to 1975. It is thus not a picture of "Bedouin plant classification today," but rather one of those ethnographic snapshots in time, providing a picture that in some respects may be fading but in others is still quite accurate. Donald Cole (1975), in his perceptive ethnographic account of Āl Murrah, one of the main tribes supplying data for the present study, uses Saudi Arabian oil revenues as an index of economic and social change in some aspects of tribal life. He notes that change was already under way at the time of his fieldwork in the late 1960s, when annual oil revenues were approaching a billion dollars. Yet those developments were still quite minor compared to what happened in the years nearer 1981, when total revenues reached $108.2 billion (Kanovsky 1994). The early 1980s was a boom time in Saudi Arabia, with tremendous expenditures on public infrastructure such as education, housing, hospitals, highways, and telecommunications as well as subsidies to the agricultural sector, including the Bedouins. In the 1960s, when I was gathering most of my data and when Cole was collecting his, Bedouin life was still in many respects what it had been in Musil's time, with the exception of some trickle-down use of motor vehicles and some income from oil company or government employment of some tribesmen. In this respect, I believe that my snapshot, even if my shutter clicked just in time, more fairly represents the old Arabia than the new. In chapter 7, I offer some comments on recent developments that may be leading to greater change in the Bedouins' experience and perception of the natural world.

The term *plants* in this study refers almost exclusively to the wild desert flora of the study area. The Bedouins' involvement in agriculture, at least at the time of my data collection, was essentially nonexistent. They used and had names for some products of cultivation—staples such as rice, dates, onions, and, of course, coffee, tea, and sugar come immediately to mind—but they knew these plants essentially as town-purchased products, not as living entities. The date palm is an exception in view of its special importance as a local staple product and the fact that Bedouins have in the past had ownership rights in some oasis date groves and are familiar with the palm as a feral or wild species in some parts of the study area. The Bedouins also sometimes purchase in villages as supplementary livestock feed some cultivated fodder plants, such as barley, oats, and alfalfa, which

are also occasionally found growing spontaneously if briefly on disturbed desert sites and thus become part of their plant universe.

Another point that bears emphasis is that although my data are drawn from a total of some ten different tribal groups, those groups are unevenly represented. The greater part of the data is taken from consultants of two tribes of the central and southern parts of the study area, Āl Murrah and Banī Hājir. In several respects, as is noted later, I have taken their core input as a standard against which I compare what might be called supplementary data from more distant groups.

I.2 Consultants, Language, and Working Procedures

The social unit involved in this study is broader than is usual in ethnobiological investigations. My data collection began with a concentration on plant nomenclature and an early objective of examining intertribal and interregional variation in names. I thus drew consultants from several different tribes. It soon became clear, however, that essentially the same "plant language" was spoken by all the northern and eastern Saudi Arabia–based tribes, from the frontiers with Jordan and Iraq down into the central Rub‘ al-Khālī. The speech of all of these tribes belongs to the same dialect group, generally known as Najdī Arabic (Ingham 1994). These tribes are pastoral nomads who consider themselves with pride to be ***badū*** (nomads) as opposed to ***ḥaḏar*** (settled folk of the towns, villages, and farms). Some subsections of virtually all of the tribes, particularly in recent years, have adopted a settled existence for economic reasons, but they still consider themselves ***badū*** by lineage and thus basically different from the long-settled agriculturists or townspeople. These tribes' social systems, material culture, and ecological relations are essentially the same, with an economy and subsistence long based on camel raising, supplemented to varying degree with sheep and some goat husbandry. All of these tribal peoples are Sunnī Muslims, and all except the northernmost such as the Ruwalah have been affected in near-equal degree by the Islamic reformist Unitarian (or so-called Wahhābī) movement that has impacted Arabian tribal and political life at intervals from the late eighteenth century to the present. On all these grounds, I felt justified in lumping my data, with the proviso that I point out and assign variations in usage to tribal sources.

I.2.1 Consultants

The number of Bedouin consultants contributing to this study (figs. 2.1, 2.2, 3.1, 4.4, 4.6, 4.13, CD.41) was approximately twenty, not counting those involved in one-time meetings such as chance field encounters with passing herdsmen. Of these twenty, a core of about ten long-term consultants contributed an estimated 80 percent of the total data. All consultants were male, ages thirty-five to seventy-five, with the majority in the upper part of this age group. All had spent at least half of their lives as active nomadic herdsmen and had been originally selected by reputation and interview for their knowledge as informants for map place-name work, field guidance, and the provision of general tribal information. These skills are based on the kind of field experience that is also basic to the acquisition of general knowledge of wildlife, including plants. All consultants received some nominal remuneration for their work time. The pay rate was eight and a half Saudi riyals per day (then equal to approximately U.S.$1.90). They were paid regularly every two weeks on the basis of fourteen days' full work, although actual work time on ethnobotany was much less.

None of the consultants had any specialist plant knowledge (of medicinal plants, for example), and all but one were nonliterate. That exception was an elder of the Shammar tribe who had acquired a very rudimentary knowledge of written Arabic. None had experience of any form of horticulture.

I.2.2 Najdī Arabic

Virtually all consultants were monolingual speakers of the Arabic dialect known as Najdī. The few and occasional exceptions were members of Āl Rāshid, al-Manāhīl, and Āl Wahībah of the southern and eastern Rubʿal-Khālī, who spoke southern Arabic and whose contributions will be so identified.

Najdī Arabic is that Arabic spoken by the settled inhabitants of the central plateau region of the Arabian Peninsula, known as Najd, and by numerous Bedouin tribes, some of which are centered in the same region and some of which have spilled over to occupy new homelands to the north and east, now outside Najd proper (Ingham 1994). It is characterized by several

archaic features found also in classical Arabic, although the idea sometimes expressed by Westerners or city Arabs that Bedouins "speak classical Arabic" is certainly not true. Some of these old features are (mainly from Ingham 1994):

1. Retention of the indefinite noun marker *(tanwīn)* suffix in the form ***-in*** (from the coalescence of classical *-un, -an, -in*).
2. Retention of classical *th* and *dh,* which have merged with *t* and *d* in many other dialects.
3. Existence of the internal passive in verbs (as opposed to the replacing prefixes *t-* or *in-* in other dialects).
4. The use of certain particles such as ***gid*** (classical *qad*) as a marker of the emphatic past and ***tham*** ("then"; classical *thumma*).

However, some classical features have been "lost," such as the distinction between *ḍ* and *ẓ,* which have coalesced (with the pronunciation of *ḍ* as *ẓ,* in my transcription *ḏ̣*).

Ingham (1994) subdivides the Najdī dialect group into three main subdialect types called *northern, central,* and *southern.* These types, in my experience, differ from one another only as much as do the varieties of American English. The northern variant, characterized by the speech of the Jabal Shammar region and the Shammar tribe, appears to be the most distinctive. The southern variant of Najdī, including the speech of the Qaḥṭān, Āl Murrah, ʻUjmān, and Banī Hājir tribes, is the most prevalent in my ethnobotanical data. I personally tend to class my informants into two groups: (1) those (more southerly) who use the name ***ʻabal*** for the genus *Calligonum,* and (2) those (more northerly) who for these plants use the name ***arṭā***.

All dialects of Arabic, like other members of the Semitic language family such as Hebrew and Ethiopic (Geez), are characterized by having verbal and nominal (including adjectival) word forms built on a skeleton of three (rarely four) root consonants in specified sequence. Each root, which is a grammatical abstraction that does not exist as such in either the spoken language or the written language, carries a broad, sometimes vague, semantic field, some aspect of which is usually recognizable in concrete vocabulary. "Real words" consist of the root consonants supplemented by various vowels and a few standard supplementary consonants

assembled in a large but finite series of patterns, providing different shades of meaning that are predictable to at least some extent. Thus, in classical Arabic, from the root (indicated here in capital letters) KBR, with the general meaning "bigness," there are derived verbal forms such as *kabura,* KaBuRa, "to grow big, tall"; *kabbara,* KaBBaRa, "to enlarge, magnify"; *takabbara,* taKaBBaRa, "to be haughty" (consider oneself big); noun forms such as *kibr,* KiBR, "greatness, stoutness"; and adjectival forms such as *kabīr,* KaBĪR, "big, large."

This syntactical peculiarity of Arabic has a consequence in ethnosemantic studies such as the one at hand. Inasmuch as the great majority of plant names can be traced, at least theoretically, to a root of some generalized meaning, nearly all of them can be conceived as exhibiting some degree of semantic transparency. This is true even of the primary, simple lexemes that are folk generics and that in many languages are often unanalyzable. The consequences and in particular the limitations of this aspect of Arabic semantics are discussed more fully in section 5.3.6.

Najdī Arabic, like other Arabic dialects, also has a collective noun form that is peculiar to names of natural objects, usually animals and plants, but also stones and minerals. Known in classical grammar as the *"ismu l-jins"* (the noun of kind)*, the form can be tested for by asking for the name of "just one of it"; the response for a generic noun will be given with the feminine singular suffix ***-ah:*** thus, ***ʻarfaj,*** "***ʻarfaj*** bushes in general"; ***ʻarfajah,*** "a single ***ʻarfaj*** bush." Not all plant names are generic nouns of this type, but the great majority of them are, and it is the form usually given in response, either in the collective or singular (technically the "unitative"), to the question "What is its name?" or "What do you call it?" Plant names in this collective noun form appear in general to be more psychologically salient than those that are not. Thus, among the life forms, the universally recognized categories ***"shajar"*** (perennials) and ***"ʻishb"*** (annuals) are collectives, whereas ***aṭ-ṭawālīʻ,*** a category apparently used by only a few northern tribes, is a standard "broken plural." All lexemes that are generic nouns are in this study given in the collective, not singular, forms.

*Interestingly, the word *jins,* which appears in the formal grammatical term, is used in current Arabic scientific writing as equivalent to the Linnaean term *genus.* In fact, the classical term *jins* appears to be derived from Greek *genos* or Latin *genus,* although many lexicons do not indicate this fact.

Like virtually all Bedouins, my consultants had had some contact with classical Arabic as used in Islamic religious observances, in formal speeches by government officials on public occasions, and, in modern form, on the radio. In general, however, except in the case of a few prayer formulas used by all Muslims, their knowledge of classical Arabic was passive—largely understood but not spoken.

I should point out that the preexisting data from which this study is drawn were not collected for linguistic purposes, at least not in the sense of maintaining a fully accurate phonetic record of what was heard from consultants. The data-collecting research environment in which I worked was rather one more typical of traditional Oriental studies, where classical Arabic was generally hovering in the background as an unspoken standard. And this environment fit my objectives. I collected place-names for the purpose, after considerable study and evaluation, of publication on Arabic-language maps in classical Arabic form. I collected my plant terminology in many cases for easy comparison with the forms of the same names that I knew might be found in classical literature. In any case, my concern was primarily that of semantics. It was not therefore unusual for me to hear a Bedouin plant name that sounded, for example, something like ***ibṣēla*** and to record it on a card in the classical form *buṣaylah.* In most cases, I jotted down all dialectal variants of the classical phonemes *qāf* and *kāf* as ***g*** or ***q*** and ***k,*** respectively, although some consultants sometimes used the fronted affricated versions ***dz*** or ***tz.*** I went to great pains to get the phonemes correct but was not much concerned with colloquial phonics, in particular the precise "coloration" of the short vowels or sometimes even their presence or absence.

I do not feel that this shorthand compromised in any significant way the purposes of this study, but it does mean that my data should not be used by a descriptive linguist as examples, say, of Banī Hājir short vowel practice when they see recorded plant names followed by "Banī Hājir." My source notes thus refer to the plant's *name,* not to its precise phonic expression. The Bedouin plant name forms should thus be taken as "common" or "normalized" Najdī Arabic, probably with a southern Najdī bias, rather than as a precise phonetic rendering of specific utterances. I do claim that my transcriptions provide generally good and fully understandable renditions of the speech that I heard even though they may not be fully consistent to the subdialect level.

I.2.3 Transcription of Bedouin Speech

Bedouin speech in my text—including individual letters, words, and quotations from consultants—is marked by the use of bold italics. I have adopted, with the idea of causing minimal discomfort to the eye of the nonlinguist, a Bedouin Arabic transcription system that resembles general approaches used in English-language Middle East studies journals. My aim here is to maintain all phonemic distinctions but minimize diacritical marks by employing conventional digraphs such as ***kh, th,*** and ***sh.*** In those very rare cases where the consonants of apparent digraphs should be read with their individual values, I insert a forward slash to indicate this: for example, ***ad/ham,*** "black," rather than ***adham***. Table I.1 lists each of these symbols followed by a linguistic description.

Several items in the Arabic sound inventory have no equivalents in English or many other Western languages. Non-Arabic speakers can follow the pronunciation guide given here for casual reading.

Vowels: Vowels should be pronounced as if they were Spanish or Italian. Vowels with macrons should be prolonged, and their syllables stressed.

Consonants: The following consonants may be pronounced as in English: ***b, d, f, g*** (as in *go*), ***h, j*** (as in *job*), ***k, l, m, n, s, t, w, y, sh*** (as in *she*), and ***th*** (as in *thin*). The digraph ***dh*** should be spoken as *th-* in the English word *the;* ***kh*** as *ch* in Scottish *loch;* ***gh*** is somewhat akin to French uvular *r* but may be spoken simply as hard *g* in casual readings. The sound ***ḥ*** is a back, heavily aspirated *h;* it may be approximated with the *h* of English.

The so-called emphatic consonants ***ṣ*** and ***ṭ*** are spoken as their nonemphatic counterparts but with the tongue retracted toward the palate. In casual reading, they may be spoken as the nonemphatics. The emphatic ***dh,*** which I write as ***ḍ,*** may be pronounced as its nonemphatic counterpart (described earlier). The Arabic letter *'ayn* (') is best ignored by non-Arabic speakers or pronounced as its associated vowel. Doubled consonants must be pronounced doubled.

I.2.4 Working Procedures

Working procedures on nearly all occasions took the form of informal interviews. My consultants would generally work with me for a few weeks

Table I.1. Bedouin Arabic phonetics and transcription

Consonants			
Plosives		Fricatives	
b	voiced bilabial	***f***	voiceless labiodental
t	voiceless dental	***th***	voiceless interdental
d	voiced dental	***dh***	voiced interdental
ṭ	palatalized voiceless dental	***s***	voiceless dental
k	voiceless velar	***z***	voiced dental
g	voiced velar	***ṣ***	palatalized voiceless dental
		ḍ	palatalized voiced interdental
Liquids		***sh***	voiceless palatoalveolar
l	dental	***kh***	voiceless uvular
r	alveolar	***gh***	voiced uvular
		ḥ	voiceless pharyngeal
Nasals		***‘***	voiced pharyngeal
m	bilabial	***h***	voiceless glottal
n	alveolar		

Continuants (Semivowels)		Vowels		
y	palatal	***i***, ***ī***	***a, ā***	
w	bilabial	***ē***	***u, ū***	***ō***

Note: The glottal stop (classical hamzah) is rare in the spoken dialect featured in this study, but I have heard it in a few words in terminal position. It is given the traditional symbol ’.

I transcribe the feminine singular suffix as ***-ah*** rather than ***-a*** because the final ***h*** may be weakly sounded in Bedouin speech. The definite article is shown, when applicable, in its assimilated form (thus, ***an-najīl,*** not ***al-najīl***). It is recognizable by the hyphen that follows it.

at a time and then would often be absent for some weeks or even months as they visited their home tribal areas and families. All work was conducted in Arabic without use of interpreters. I checked names with several consultants whenever possible, and I recorded the consultant’s tribe along with that person’s name. I compiled formal lists from multiple consultants only in a few cases, such as for investigation of the concept of “the seven ***ḥamḍ*** plants” (section 5.3). No attempt was made to explore any one person’s total plant name inventory, and my data represent the set theoretical union of names collected from all sources. I nevertheless feel that my inventory of folk generic and higher-order names, after the deletion of synonyms, would approximate the repertoire of an average elder, field-experienced

Bedouin who might be encountered during the years of data collection (1960–75). Inasmuch as all of these consultants gained their knowledge of plants well prior to any significant economic changes stemming from development of the Saudi Arabian oil industry, I am confident also that resulting changes in Bedouin life would not have truncated this knowledge to any significant degree.

I elicited plant names through identifications in the field by consultants acting as guides or by my presentation of fresh or, very rarely, pressed specimens in the office. On a few occasions, consultants traveling alone brought in specimens from remote areas at my request. Much of my spare time between 1962 and 1988 was devoted to learning and recording the flora in scientific taxonomic fashion as the basis for a flora of eastern Saudi Arabia (Mandaville 1990). This work was based on the collection of several thousand specimens deposited mainly in the Natural History Museum, London, with smaller collections going to Kew, Edinburgh, and Washington, D.C. Middle East plant specialists at these institutions checked my plant identifications or determined my unknowns. I made no separate voucher collection for the vernacular name work. I can attach, however, with confidence specimen numbers and their herbarium locations to each folk name, and such data are provided in my inventory of folk generics.

My greatest regret now with regard to work methods was my inability to include information from female consultants. Cultural restrictions in this very conservative Muslim environment and the location of my usual office workplace made it very difficult for me, a male investigator, to consult with women. Such consultation might have been possible in a situation where one could gain family confidence by living in the field for long periods in the company of a Bedouin group. My field trips, however, never included stays of more than a weekend with any one family. By far the most important Bedouin use of plants is for livestock grazing, and herding is primarily a male activity. There was some indication, however, that the women might have been more knowledgeable about food and medicinal uses of wild plants. I hope another investigator, preferably a woman, will find an opportunity to study the entire gamut of Bedouin–plant relationships from the women's viewpoint and tell us of the results.

As is always the case in ethnobotanical fieldwork, we researchers teeter on the shoulders of our consultants, and some of them have broader

shoulders than others. The following partial list of names is provided both as some basis for future gauging of the accuracy of my data and in gratitude to those who gave most generously and patiently of their knowledge: ʿAlī ibn Saʿīd ibn ʿAlī of al-Makhaḍibah of Banī Hājir; ʿAlī ibn Ḥamad ibn Fāriʿah al-Ḥurayrī of Āl Ḥurayr of al-Ghayāthīn of Āl Murrah; Sālim ibn Ḥamad ibn Miznah of al-Ghayāthīn section of Āl Murrah; Haḍbān ibn ʿAlī ibn Naffāḥ of al-Jabrān of al-Jarābiʿah of Āl Murrah; Juḥaysh ibn Muṭlaq al-Ghuyaythī of al-Ghayāthāt of ad-Dawāsir; Muḥammad ibn ʿAbd Allah ibn Khurṣān of Qaḥṭān; Khulayf ash-Shammarī of Shammar, whose full name I can now find no record of, but whose counsel on northern plant lore was invaluable; Sārī ibn Mukhaylīl of ar-Ruwalah; and Muḥammad ibn Maʿwīḍ ibn Saʿīd of Bayt al-Laʿbah of Bayt Yamānī of Āl Rāshid, who spoke a southern, non-Najdī dialect and taught me more about camels than about plants, but whose knowledge of the sparse Rubʿ al-Khālī flora seemed unrivaled.

For general written Arabic, including current tribal, personal, and place-names (except a few towns that have accepted English spellings), I follow a modified version of the system used by Great Britain's Permanent Committee on Geographical Names and the U.S. Board on Geographic Names.

For the scientific taxonomy and nomenclature of vascular plants, I follow Mandaville 1990, which is still reasonably up to date. I refer also to one or two species not found in the coverage area of that flora or subsequently described as new.

All reference identifiers in the text beginning with the prefix "CD" refer to photographs or other materials on the CD-ROM provided in the back pocket.

The Land

THE GEOGRAPHICAL AREA of this study, in eastern Saudi Arabia, is portrayed in figure 1.1. The part enclosed by the dotted line is what I would refer to as the "core area," which is that region ranged by my primary consultants' tribes and in which I have fairly complete scientific taxonomic knowledge of the flora. Tribal names shown outside that area indicate the range centers of other groups contributing data but for whom I do not have a reasonably full ethnobotanical inventory. The names are placed in the approximate centers of the home territories, or ***dīrah***s, where each group's water and occupation rights are generally unquestioned.

1.1 Geology and Topography

For place-names referred to here and in other parts of this study, see figure 1.2. The core geographical area for this study covers approximately 520,000 km^2 in eastern and northeastern Saudi Arabia. It lies in part of what geologists know as the Arabian Shelf, the eastern of the two major structural provinces of the Arabian Peninsula. Making up a bit less than two-thirds of the peninsula's total area, this province is characterized by eastward-dipping sedimentary rock strata laid down by ancient seas on a crystalline basement complex. The total depth of these sediments increases from zero at the surface contact with the basement in the west to more than 5,000 m eastward and southeastward in the basins beneath today's Persian Gulf and northern Rubʿ al-Khālī sand desert. Upper Jurassic and some earlier horizons in this sequence provide the prolific reservoirs of the world's largest onshore and offshore oil fields (Powers et al. 1966). The exposure of the basement complex in the western part of the peninsula forms the other major geologic province, the Arabian Shield, composed of Precambrian metamorphic and igneous rocks that were continuous with an African shield counterpart until separated by the opening of the Red Sea rift in later Tertiary times. This event came too late to block some biological commonality, particularly with the dominance of *Acacia*

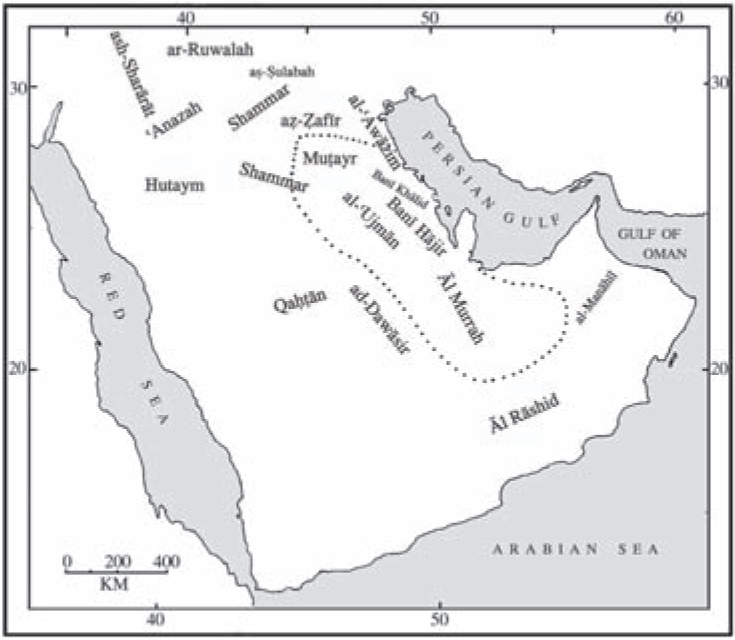

FIGURE 1.1. Arabian Peninsula, showing the study area. The core study area is enclosed in the dotted line. Names of consultants' tribes are centered on their home territories.

species and associates, between the flora of western Arabia and the flora of lands on the western side of the Red Sea (Mandaville 1984).

The study area is bounded on the east by the western shore of the Persian Gulf and on the west roughly by the western margin of the great linear arc of dunes called ad-Dahnā’. It extends northwestward into the northern plains and in the south includes the northern part of the Rubʻ al-Khālī. The greatest part falls within the current Saudi Arabian administrative area known as the Eastern Province. The northwestern portion, beyond the long depression called al-Bāṭin, is administered as part of the Northern Frontiers.

Overall, this region is of slight to moderate topographic relief. The surface, where not obscured by bodies of wind-blown sands, gravel sheets, or evaporites, consists of Tertiary sedimentary rocks. The land rises almost imperceptibly westward from the convoluted shoreline of the gulf across

FIGURE 1.2. Central and northern Arabian Peninsula showing place-names mentioned in the text. The majority of name spellings on this map follow the (unmodified) Board on Geographic Names system.

FIGURE 1.3. In the edge of the Jāfūrah sands near the southern edge of the coastal plain and the international boundary with Qatar. The landform type with large bushes here is called a ***gōẓ***, always characterized by the dominant shrub ***ghaḍā***, *Haloxylon persicum*.

flat to rolling sandy plains until, at an elevation of some 250 m, it meets the rocky escarpment marking the edge of the Ṣummān plateau (fig. CD.27). In the northern and northwestern areas of the region, the coastal zone merges gradually with smooth plains, in parts covered with lag gravels and in other parts with shallow sands. In the southern area, the zone meets other gravel plains leading into the hyperarid Rubʿ al-Khālī, which extends a tongue of mobile sands, al-Jāfūrah, northward along the coast (figs. 1.3, CD.3).

Shallow sands cover most of the coastal lowlands, and in some parts, particularly in the Jāfūrah sand body south of about 26°N, these sands may be heaped up into permanent areas of wind-blown dunes. Limestone or sandstone bedrock erosion remnants in some areas rise above the sand surface, but they seldom stand more than 30 to 60 m above mean local elevation. This coastal region includes the ancient and still important spring-fed

oases of al-Qaṭīf on the coast and al-Ḥasā farther inland, and water sources are overall more plentiful in this region than in other topographic regions of the study area. Hand-dug wells, generally quite shallow and often seasonal, provide brackish water traditionally used for livestock and Bedouin households.

Far more important since the 1970s, however, are the deeper water wells drilled for the region's widespread oil-production facilities and in some cases by government agencies such as the Ministry of Agriculture and Water. It was long-standing oil company policy to leave exploration bore holes open for Bedouin use when potable water was encountered, and these wells provide water in much greater quantity and with greater dependability than the old hand-dug wells. There are no natural perennial streams in any part of our study area, and dry water courses flow only briefly after rare, heavy rains in their watersheds.

A characteristic terrain type of the coastal lowlands, found extensively near the gulf but also at some points farther inland, is the salt flat known as the *sabkhah* (pl. *sibākh*). These flats are dead-flat areas, sometimes several miles wide, with a characteristic puckered, brownish salt crust that overlies a shallow brackish or briny water table. Along the coast, they may be formed by the filling of former bays and estuaries with silts and marls. The crust, usually only a few inches thick overlying briny mire, is too saline to support plant life, but the flat's margins may be surrounded by zoned halophytes. Camel herders and automobile drivers alike avoid these surfaces, especially after winter rains. Any vehicle attempting to cross such an uncompacted surface will almost immediately bog down beyond its axles. Some of the *sibākh* are crossed by long-established automobile routes consisting of little more than two narrow tracks but in which the crust surface has been compacted by long use. These tracks provide passable routes except after heavy rains.

The coastal lowlands have been fairly well furnished with paved roads since the 1970s. Apart from the trackless parts of *sibākh* and areas with large mobile dunes, this terrain is also easily passable by off-road vehicles. Even the heavier dune areas may be crossed by skillful drivers in high-clearance vehicles equipped with sand tires.

The Ṣummān plateau, which varies in width from about 80 to 250 km, is rocky terrain marked by low limestone hills and knolls and by depressions and basins sometimes floored with whitish silt playas (fig. CD.9).

Along its eastern margins, erosion has cut channels in the rocky plateau edge, leaving a line of outstanding buttes and tablelands. The plateau rises gently toward the west to an elevation of about 400 m, where it meets the eastern edge of the Dahnā' sands. For the most part, this terrain is easy for motor vehicles with adequate ground clearance. Water supplies are scarce compared with those of the coastal lowlands, though, and there are fewer hand-dug wells, although some rock- or silt-floored basins may hold pools of rainwater for weeks after rare heavy winter rains. What hand-dug wells are found in the plateau tend to be very deep, in some cases exceeding 60 m. The sands of the Dahnā' bound the Ṣummān plateau on its western side, and the western edge of these dunes forms a convenient boundary for the study area. This long, narrow arc of dunes is one of the major topographic features of Arabia and has traditionally marked the eastern threshold of the central Arabian plateau lands known as Najd. The belt of red dunes in the Dahnā' (red because the sand grains are stained by iron and other metallic oxides) links the major sand body of northwestern Arabia, the Nafūd, with the Rub' al-Khālī in the south. In many parts, it consists of several parallel ridges (called *'urūq,* sing. *'irq,* literally "vein" or "nerve") of dunes, each with a specific name, separated by intervening bands of harder ground. The *'urūq* display varied dune forms, from barchans to high-peaked star dunes, and all are difficult to cross off-road with motor vehicles, although there are some recognized tracks that avoid the most difficult terrain. Apart from some deep bore holes that have been drilled since the 1970s, the Dahnā' is a virtually waterless area, although its deep sands have traditionally been a favorite winter grazing ground for the Bedouins (figs. 1.4, CD.1).

North of about latitude 27°30′ N and west of 48° E, the coastal lowlands merge gradually into flat plains. Diminishing relief and sand cover mark this transition as the general land elevation rises very gradually toward the west. Broad parts of these flatlands are made up of late Pliocene or early Pleistocene alluvial deposits from the Wādī ar-Rumah/al-Bāṭin drainage system, with silty surfaces strewn with lag gravels and cobbles carried all the way from the igneous and metamorphic exposures of the Arabian Shield in western Arabia. Farther to the northwest, the smooth plains grade into the region known as al-Ḥajarah (the Rock Lands), with its rough surface of exposed limestones. Over most of this area, at least as far as the margins of the rougher al-Ḥajarah, the flat and generally

FIGURE 1.4. Dune lands of the Dahnā’ sand belt on the northwestern edge of the study area. The larger shrubs are ***‘abal,*** *Calligonum comosum,* important as browse and a source of firewood.

smooth terrain is ideal for off-road vehicle travel. A major topographical feature is the broad, linear, southwest-to-northeast-aligned depression of al-Bāṭin, the course of which marks the line of a major flow channel cut during earlier pluvial times. Water resources in all of this area today are very poor, and the few hand-dug wells are deep (40–60 m). Even deep-drilled boreholes provide only poor-quality water.

South of roughly the Twenty-third Parallel, the study area enters the northern precincts of the Rub‘ al-Khālī, which has a total area of some 650,000 km^2 and has been described as the largest area of continuous sand cover in the world. Its sands are underlain in the west by the ancient gravel flows of Wādī ad-Dawāsir, and its floor grades farther downslope into evaporites with marls and *sabkhah*s exposed among the dune massifs of its eastern parts. Dune structures are of great scale, ranging from broad sand sheets in the north to parallel linear forms scores of kilometers long and rounded “sand mountains” up to 250 m high (figs. CD.13, CD.14).

My study area extends through only the northwestern quadrant of this great sand area, corresponding roughly to Āl Murrah tribe's range, although I did acquire some limited ethnobotanical data from tribesmen of the sands farther south. Water supplies in the Rubʿ al-Khālī are extremely limited, with few hand-dug wells providing water fit for human consumption. Other wells provide high-salinity water that can be tolerated by camels and thus make possible some exploitation of limited grazing resources, generally limited to the cool season and to areas that have been favored by recent rains. Oil company explorationists pioneered the use of motor transport in the Rubʿ al-Khālī in the late 1930s (fig. CD.18). Today Bedouins use off-road vehicles there, sometimes even in such difficult terrain as the huge dune massifs of the northeast.

1.2 Climate

The dry, subtropical climate of eastern Saudi Arabia is typical of that of world desert regions lying along the poleward margins of the Trade Wind belts and in the descending belt of the Hadley Cell. These regions receive generally stable, descending air that is adiabatically warmed as it loses altitude and is consequently dried (Wallén 1966, 32; Allan and Warren 1993, 14). This process leads to the formation of semipermanent high-pressure zones with divergent circulation that suppresses cloud cover and precipitation except when this pattern is disturbed by incursions of rare storm centers from outside. The southernmost parts of the Arabian Peninsula lie along the southern margin of this climate province. In summer, with the seasonal northward shift of the Intertropical Convergence Zone, these parts may be touched by precipitation from the rising air masses of that belt (Huschke, Rapp, and Schutz 1970), which brings summer moisture to the coastal region of Dhufar and increases somewhat the still-rare chances for summer convectional rains as far inland as the southern Rubʿ al-Khālī.

The entire study area, however, as far south as the central Rubʿ al-Khālī, has a Mediterranean climate regime in the sense of exhibiting a clear division into hot and cool seasons with rainfall confined almost exclusively to the cool period of October to April. The winter rains are associated with "Mediterranean" or "western" depressions, which are low-pressure storm centers that enter from the Mediterranean region and move east and southeast across the Arabian Peninsula (Huschke, Rapp, and Schutz

1970, 12). Particularly in spring, these depressions may bring squall lines and thunderstorms with brief torrential rains and gale-force winds. In midwinter, they tend to bring prolonged cloud buildups with longer and more beneficial rains. They are gradually dissipated as they move across the peninsula, and the probability of rain decreases to the southeast. They do not normally carry precipitation as far as the Rub‘ al-Khālī, but there are exceptions, such as the broad frontal development with widespread rains I saw across the central and southwestern sands in February 1982.

Annual rainfall means range from around 115 mm in the far north and northwest of our area to less than 35 mm in the central Rub‘ al-Khālī. Dews are not infrequent in the coastal areas, but they have not been measured or otherwise evaluated. Snow is virtually unknown, although there have been very rare minor snowfalls in the Najd uplands just outside our area, such as the one that occurred in Riyadh and al-Kharj on 3 January 1973. Brief, intense hail storms sometimes accompany spring squalls.

For plant life, the reliability of rains from year to year is as consequential as its amount. The variability of rainfall amounts in the study area is typical of many world arid regions. For example, total annual rainfall at Dhahran over thirty-nine years ranged widely between extremes of 5 mm and 277 mm (Arabian American Oil Company 1979). One measure of rainfall variability is "relative interannual variability," calculated by finding the average of year-to-year rainfall differences over a long period and expressing this average as a percentage of the mean (Wallén 1966, 38). This value for the great majority of our study area stations ranges between 70 and 90 percent. Between individual years, variability may exceed the mean. Annual and monthly rainfall records and relative variabilities for selected stations in our area are summarized in table 1.1. The majority of the station locations are shown in figure 1.2.

Temperatures measured by standard means range from an absolute maximum of 52°C (Abqaiq in July) to −3°C inland in January. Frosts have been reported inland as far south as the central Rub‘ al-Khālī. Points near the gulf coast experience less-extreme ranges. Temperatures for Abqaiq (fig. 1.5) are typical for inland stations.

Evaporation rates are of special interest in any study involving natural vegetation because of their close relationship to evapotranspiration and availability of surface moisture for plant growth. Most of the data for our study area are in the form of open-surface measurements by the American

TABLE 1.1. Rainfall data, Eastern Province stations

Station	Mean Annual Rainfall, mm				
	Mean	Absolute Maximum	Absolute Minimum	Years Record	Percent Variability
as-Saffānīyah	109	206	30	11	81
al-Qayṣūmah	108	348	8	23	56
an-Nu'ayrīyah	108	300	23	15	77
ash-Shumlūl	107	283	33	11	76
Ras Tanura	94	297	9	27	79
Abqaiq	92	181	7	30	89
27-08N, 49-12E	86	247	10	14	85
aṣ-Ṣarrār	80	230	43	14	71
Dhahran	77	277	5	42	89
Khurayṣ	63	158	12	14	85
al-Hufūf	59	146	14	14	73
Yabrīn	39	104	9	14	71

Station	Mean Monthly Rainfall (mm)											
	J	F	M	A	M	J	J	A	S	O	N	D
as-Saffānīyah	20	25	20	16	1	0	0	0	0	0	9	41
al-Qayṣūmah	23	15	15	20	8	0	0	0	0	4	10	19
an-Nu'ayrīyah	20	17	21	24	2	0	0	0	0	0	12	31
ash-Shumlūl	20	15	18	22	3	1	0	0	0	3	11	17
Ras Tanura	24	15	11	14	3	0	0	0	0	5	5	21
Abqaiq	21	19	13	10	3	0	0	0	0	0	3	18
27-08N, 49-12E	19	8	18	20	10	1	0	0	0	3	5	12
aṣ-Ṣarrār	7	10	16	17	4	0	1	0	0	5	6	15
Dhahran	17	12	12	10	2	0	0	0	0	0	9	17
Khurayṣ	8	3	18	26	0	0	1	0	0	0	0	10
al-Hufūf	10	2	19	26	0	0	1	0	0	0	0	10
Yabrīn	4	5	12	8	1	0	0	0	0	0	2	3

Note: Monthly means do not add to annual means, having been derived from different data. "Percent variability" refers to "relative interannual variability" as defined in the text.

Sources: Arabian American Oil Company 1979; Saudi Arabian Ministry of Agriculture and Water Resources, *Hydrological Publication* (various issues); Saudi Arabian Ministry of Planning, *Statistical Yearbook* (various issues through 1998).

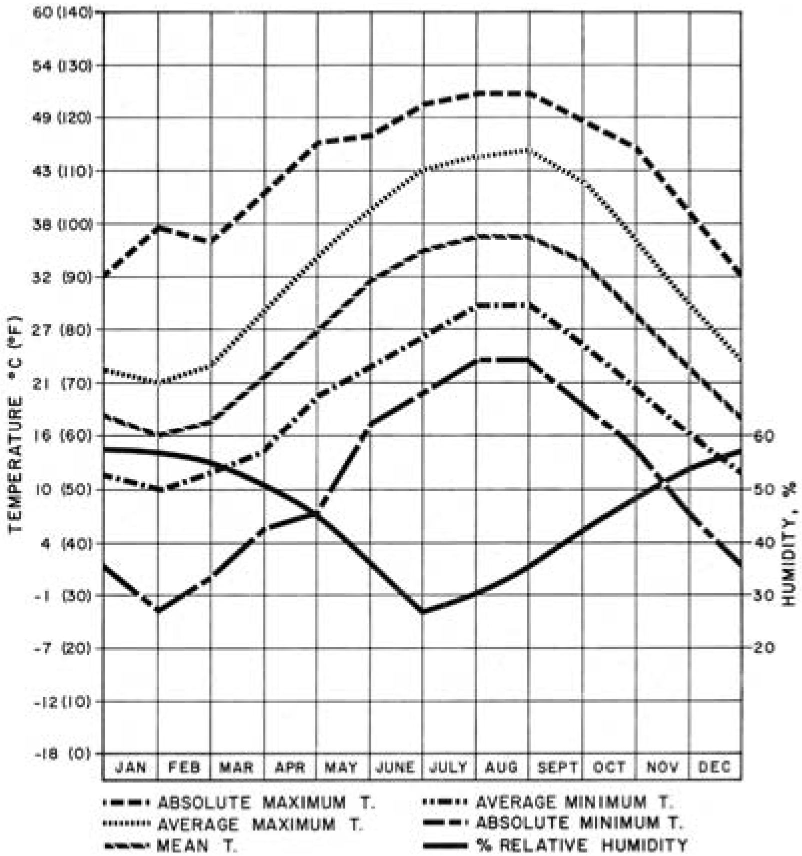

FIGURE 1.5. Monthly average temperature and humidity at Abqaiq (1950–1976). From Arabian American Oil Company 1979, courtesy of the Saudi Arabian Oil Company (Saudi Aramco).

Class-A pan method. Some of these data are summarized in table 1.2, which shows rates ranging from thirty-five to one hundred times the local mean annual precipitation. Direct measurements are not available for the probably most extreme conditions in the central Rub‘ al-Khālī, but the rates listed for al-Aflāj and as-Sulayyil, near this region's western borders, suggest the values to be expected.

The mean wind velocities measured in eastern Arabia are not great by world standards, but wind effects in such an open, loose-soiled desert

TABLE 1.2. Mean annual evaporation rates, south-central to eastern Saudi Arabia

Station	Evaporation (mm)	Years Recorded
al-Hufūf	2,660	4
al-Qaṭīf	2,960	4
al-Kharj	3,070	5
Ḥaraḍ	3,451	1
al-Aflāj	4,130	6
as-Sulayyil	5,250	9

Source: Saudi Arabia Ministry of Agriculture and Water Resources, *Hydrological Publication* (various issues). Measurement method is Class-A pan.

environment can often prove decisive for plant survival. Winds significantly increase the desiccating power of the already hot, dry atmosphere, have a powerful effect in molding topography, particularly in dune sands, and directly affect individual plants' root stability. They also have strong effects on the human environment, reducing visibility and general comfort.

Winds in our area have a diurnal tendency to increase around midday, probably as a result of differential warming. More spectacular are the results, even far inland, of a strong seasonal pressure pattern over the gulf. The directional pattern of the basically northeast Trades are strongly distorted beginning about May, when a trough of low pressure moves up the gulf as an extension of the great seasonal low over the Asian land mass to the east (Huschke, Rapp, and Schutz 1970). This low-pressure system leads to the well-known *shamāl* (literally "north") wind of early to middle summer, which may blow for days, sometimes gusting 30 to 65 km/hr from the north to the northwest along the isobars of the gulf low. From north to south, there is a progressive directional shift in this wind from northwest to north and finally northeast—all apparent in the longitudinal dune alignments of the Dahnā' and the Rub' al-Khālī. The *shamāl* (which Westerners often somewhat inaccurately equate with the dust storms that may or may not accompany the wind) is always quite dry. Its coincidence with rising summer temperatures and longer days makes June and July the time of greatest moisture stress for plants and animals. August, although a hot month, is the calmest, with rising relative humidity. Figure 1.6, diagramming mean wind speed and direction for Abqaiq, shows the *shamāl*'s directional skewing effect.

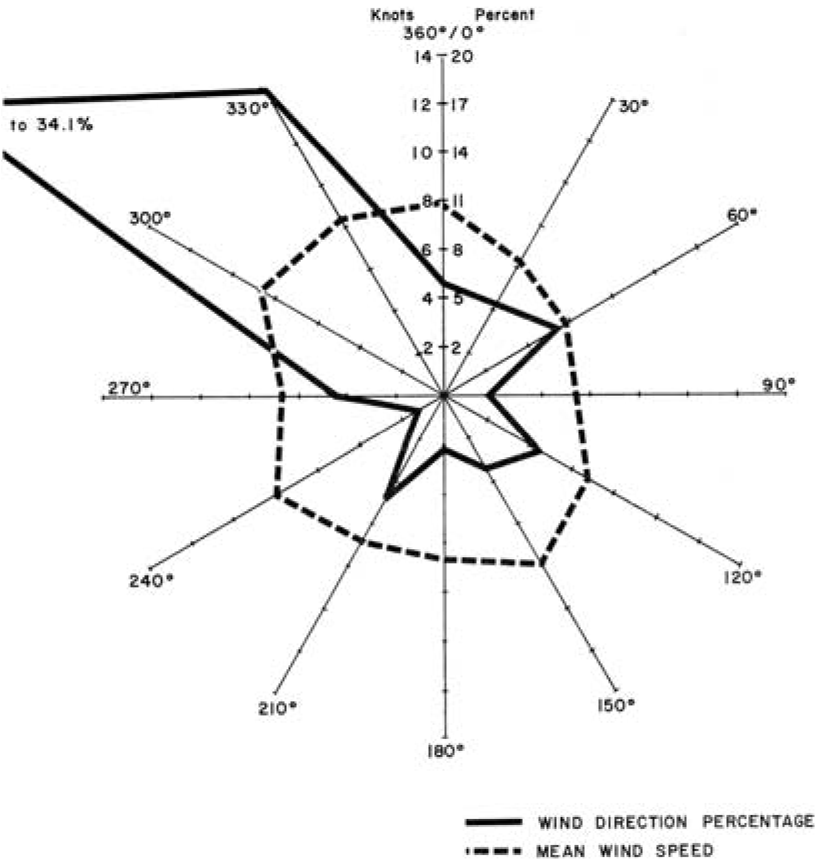

FIGURE 1.6. Mean wind speed and direction at Abqaiq (1967–1970). From Arabian American Oil Company 1979, courtesy of the Saudi Arabian Oil Company (Saudi Aramco).

Relatively strong northerly winds may also occur in winter. Dust storms are common in our area, particularly in the *shamāl* season, when they may go on for days with reduced visibility. True sand storms, where sand is raised a meter or more above ground level, require exceptional wind velocities and are rare. The great bulk of sand movement takes place within 50 cm of the surface (Bagnold [1941] 1973, 10–11).

A glance at the rainfall and temperature charts for the study area shows immediately that we are dealing with "arid lands" or "desert." The Bedouins

do not refer to their living space as “desert.” They call it simply ***al-barr*** (the land), as do perhaps many peoples whose homelands are arid. Aridity in science can be more precisely defined. Students of dryland climates have long been concerned with methods of classifying different regions in terms of their aridity, which is basically the relationship between water needs and water supply. More than a dozen well-known climate classification systems or “indices of aridity” have been devised to provide qualitative or quantitative means of comparing different arid lands (for a useful summary of these systems, see Reitan and Green 1968, 44–52; McGinnies 1988, 61–62). The more recent systems have emphasized the factor of potential evapotranspiration because of its more direct relationship with moisture conditions and plant water use, and they utilize as an aridity index the ratio P/PE, where P refers to precipitation and PE to potential evapotranspiration.

The United Nations Environment Program (UNEP) carried out worldwide mapping of arid zones in 1992 and published the results as part of its *World Atlas of Desertification* (UNEP 1992). The ratio P/PE was taken as the defining function, with calculations of PE based on the Thornthwaite (1948) method. The boundary between “hyperarid” and “arid” regions was placed at a P/PE value of 0.05. Our study area was shown on the world-scale map as “arid” north of approximately the Twenty-eighth Parallel and “hyperarid” to the south of that line. UNEP’s *World Atlas* was revised in 1997, with class definitions still based on the 1992 map. This revision had very little effect on the 1992 classification of the Arabian Peninsula.

In view of the very few data points (two or three stations on the gulf coast) used in the 1992 and 1997 UNEP mapping projects (maps of precipitation and temperature stations in UNEP 1992, 1997), I calculated P/PE for three inland points in the northern, central, and southern parts of our study area, respectively, using the Thornthwaite (1948) method to estimate PE. I adjusted those PE values following Hulme, Marsh, and Jones’s empirical formula (1992, 12–17) to correct for the Thornthwaite method’s tendency to underestimate PE in arid environments. This correction places my calculations on the same basis as those of UNEP (1992, 1997). Table 1.3 shows both my unadjusted and my adjusted PE values for each station.

These results do confirm the general accuracy of UNEP’s 1992 and 1997 mapping of our study area within its own definitions of aridity classes.

TABLE 1.3. P/PE ratios for three study area stations

Station	P (mm)	PE (mm)	PE_a (mm)	P/PE_a	Years Data
al-Qayṣūmah	115	1,331	1,927	0.059	30
Abqaiq	92	1,483	2,134	0.043	30
Yabrīn	39	1,533	2,222	0.018	7

Note and sources: P = annual precipitation; PE = calculated potential evapotranspiration by the Thornthwaite (1948) method; PE_a = PE adjusted by the method in Hulme, Marsh, and Jones 1992, 12–17. Source of temperature and precipitation input data: Arabian American Oil Company 1979; Saudi Arabia Ministry of Agriculture and Water, *Hydrological Publication* (various issues); Saudi Arabia, *Statistical Yearbook* (various issues to 1998).

Yet both of these world arid lands maps (UNEP 1992, 1997), with respect to their written descriptions of "hyperarid" regions, are at some variance with my field experience. They characterize such regions as having no seasonality of rainfall, yet all of our hyperarid area, even down through the northern Rub‘ al-Khālī, shows a clear winter–spring rainfall regime with rainfall virtually zero at other times. The boundary of "nonseasonality" seems to lie farther south in the Rub‘ al-Khālī. These descriptions call the hyperarid environments "the true deserts" that "offer very limited opportunities for human activities" (UNEP 1992, 5; 1997, 5). The expression "very limited" is of course relative and open to interpretation, but our Bedouin consultants would no doubt beg to differ with UNEP's evaluation.

1.3 Vegetation and Flora

As viewed by the plant geographer, our study area falls entirely in the Saharo-Sindian regional zone, that great desert biome that extends all the way from the Atlantic coast of North Africa across Egypt and the Arabian Peninsula and into the arid region of northwestern India. Within the Arabian Peninsula, this zone is generally now divided into an Arabian regional subzone and a Nubo-Sindian province (Kürschner 1998). All but perhaps a narrow gulf coastal belt of the study area lies within the Arabian subzone. I have suggested in earlier work (Mandaville 1984, 1990) that the entire southern half of the peninsula can be assigned to a Sudanian (corresponding to the Nubo-Sindian) province on the basis of contracted occurrences of *Acacia* (except in the Rub‘ al-Khālī). These occurrences, however, might also be treated as relicts or intrusives in Saharo-Arabian territory.

The assignment of the gulf coastal zone of the study area to the Nubo-Sindian province is based on the occurrence there of communities led by Nubo-Sindian species such as *Panicum turgidum* (fig. CD.8) and associates including *Cymbopogon, Eremopogon, Leptadenia pyrotechnica, Salvia aegyptiaca, Monsonia,* and *Polygala erioptera.* The boundary with Saharo-Arabian territory, however, is very poorly defined (Kürschner 1998).

The study area is overall characterized by communities of widely spaced subshrubs or in some cases by totally shrubless zones, either of which condition may be associated with more or less dense sprinklings of ephemeral annuals restricted entirely to the late winter–spring season and reflecting the seasonal and chance spatial patterns of local rainfall. The proportion of these briefly growing annuals (as a fraction of total species) is greatest in the study area's northern plains, about 63 percent, and declines southward to about 17 percent in the northern Rubʿ al-Khālī (Mandaville 1990, 25). Total perennial vegetation cover is in general considerably less than 10 percent. Tree forms are virtually absent except in cultivated areas or as a few rare stands of *Acacia* associated with basins or the larger relict water courses.

Many of the more important plant communities are led by shrublet dominants of a single species. The majority of these formations appear to be in close equilibrium with their natural environment, and the processes of plant succession sometimes emphasized in studies of mesic or humid regions seem to play a minor role except on disturbed sites. The vegetation is overall best developed and probably most productive in the boundary region between the study area's central coastal lowlands and the northern plains, where favorable soil conditions and greater rainfall occur together. The following brief descriptions of some of the study area's more significant plant communities are based on my field experience and not on any formal attempt at a plant-sociological analysis.

1.3.1 ***Rimth*** Saltbush Shrubland

This open shrubland dominated by the ***rimth*** saltbush, *Haloxylon salicornicum* (Chenopodiaceae), probably covers more area than any other community in northeastern Arabia (fig. CD.95). It occurs from Iraq in the northeast down into the northern edge of the Rubʿ al-Khālī. It is best developed on deeper stabilized sand where its stature increases and spacing is closer, but

Table 1.4. Survey data, ***rimth*** saltbush shrubland

Shrub Layer		
Total density: 772/Ha	Total cover: 8.6 percent	
Species	Relative Density	Percentage of Total Shrub Cover
Haloxylon salicornicum	.90	95
Panicum turgidum	.08	3
Lycium shawii	.02	2

Annual Layer		
Species	Frequency	Density/m²
Plantago boissieri	.92	145
Schismus barbatus	.84	65
Astragalus spp.	.64	14
Ifloga spicata	.60	50
Lotus halophilus	.44	8
Paronychia arabica	.32	6
Medicago laciniata	.32	5
Launaea capitata	.28	4
Crucianella membranacea	.28	4
Cutandia memphitica	.16	2
Ononis serrata	.12	2

it occurs also on gravel plains and even over the rocky Ṣummān, where it is wide spaced and stunted (figs. CD.10, CD.12). On 18 February 1970, I surveyed a well-developed stand 18 km southwest of as-Saffānīyah (study site in 27°53.4′ N, 48°37.8′ E) with the results shown in table 1.4. There had been good rains, and this sampling included twenty annuals, of which those with a frequency of .1 or greater are included in the list.

1.3.2 ***ʻArfaj*** Shrubland

In this open shrublet community, ***ʻarfaj*** (*Rhanterium epapposum,* Compositae) is dominant (figs. 1.7, CD.4, CD.5, CD.7). ***ʻArfaj*** is best developed in parts of the northern plains and northern Ṣummān where bedrock is not far beneath the surface. It is found also in Kuwait and Iraq and reaches south to about the Twenty-third Parallel, where it may still be seen along the eastern edge of the Dahnā' sands. A pure stand of *Rhanterium* that I

FIGURE 1.7. A dense stand of ***‘arfaj,*** *Rhanterium epapposum,* northwest of an-Nu‘ayrīyah in the north-central coastal plain. An example of probably the most productive plant community in eastern Saudi Arabia and an important grazing resource. The shrublets are about 1.1 m high.

surveyed on 17 February 1970 at a location 17 km northeast of Qaryat al-‘Ulyā (study site in 27°36.7′N, 47°49.2′E) had an unusually high perennial density and cover: 3,145 plants per hectare and 16.3 percent, respectively. A semirandom quadrat sampling of the annual layer showed the associates that have a frequency of .10 or greater (table 1.5).

1.3.3 ***Thmām*** Grass-Shrubland

I use the term *grass-shrubland* for this community type rather than *grassland* because this species of perennial grass, ***thmām,*** *Panicum turgidum,* grows as spaced, rounded, and culm-branched “shrublets” rather than as tufts or turf. This community (figs. 1.8, CD.8) is widely distributed in the coastal lowlands, from the coast up to about 100 km inland. It sometimes has woody associates such as *Calligonum comosum* (which may function as a codominant), *Lycium shawii,* or (near the coast) *Leptadenia pyrotechnica.*

TABLE 1.5. Annuals in ***'arfaj*** shrubland

Species	Frequency	Density/m²
Plantago boissieri	.73	22
Picris babylonica	.56	7
Schismus barbatus	.49	12
Neurada procumbens	.48	4
Erodium laciniatum	.16	1
Asphodelus tenuifolius	.15	1
Medicago laciniata	.13	1
Plantago ciliata	.12	1
Rostraria pumila	.10	2
Astragalus spp.	.10	1

Note: A total of 18 other annuals of lesser frequency were also recorded.

On 19 October 1980, I surveyed, using the quarters method, a stand 25 km south–southwest of al-Fāḍilī (study site in 26°46.0′ N, 49°05.7′ E), finding the *Panicum* at a density of 1,439 plants per hectare, *Calligonum comosum* at 76 per hectare, and total shrub cover of 3.5 percent.

1.3.4 *Calligonum–Artemisia* Sand Shrubland

This distinctive community is found on inland dune sands of the central and northern peninsula, particularly in the Dahnā' south to about the Twenty-third Parallel (fig. CD.1). Its diagnostic species is *Artemisia monosperma* (Compositae), which is hardly found outside this association. *Calligonum comosum* (Polygonaceae) is almost always present, and *Scrophularia hypericifolia* (Scrophulariaceae) is an associate in parts of the northern Dahnā'. When cool-season rains have been good, this formation supports a wide variety of annuals, including *Plantago* species, *Eremobium aegyptiacum, Cutandia memphitica, Linaria tenuis,* and *Anthemis scrobicularis.*

1.3.5 *Ephedra* Shrubland

This community, which may be associated with gypsaceous soils, is characterized by essentially pure stands of *Ephedra alata* (Ephedraceae). It occurs in scattered locations, each seldom of great areal extent (fig. CD.160).

FIGURE 1.8. ***Thmām*** grass-shrubland, led by *Panicum turgidum,* on the north-central coast near Rās Tanājīb. The grass "shrublets" are about 0.75 m high.

1.3.6 *Achillea–Artemisia* Silt Basin Association

This northern community type is distinctive by its highly aromatic dominants, the composites *Achillea frangrantissima* and *Artemisia sieberi.* It is common in the Ḥajarah and al-Widyān regions on the northwestern borderlands of our area, but patches of it may be encountered on heavy silts and clay basins of the northern plains and in the Ṣummān.

1.3.7 ***Ghaḏā*** Shrubland

This community (figs. 1.3, CD.3) has as its dominant the large ***ghaḏā*** shrub, *Haloxylon persicum* (Chenopodiaceae), and is found in some deeper sand habitats of the southern coastal lowlands and the northern Rub' al-Khālī. ***Ghaḏā*** is the largest of our saltbushes, sometimes exceeding man height, and is found in sand terrain less stable than that supporting ***rimth****, Haloxylon salicornicum.* It may form islands in ***rimth*** country, and in the Rub' al-Khālī it may border ***ḥādh*** shrubland (described in the

next section). ***Ghaḍā*** grows more widely spaced than the smaller saltbushes but contributes much greater cover per individual. Because it is found in the more southern parts of our area with mobile sand and less rainfall, the variety of annuals associated with it is usually quite limited: *Plantago boissieri, Eremobium aegyptiacum,* and, at least in the northern parts of its range, *Silene villosa.*

1.3.8 ***Ḥādh*** Saltbush Shrubland

This community (figs. CD.17, CD.18) is endemic to the Rubʿ al-Khālī, as is its dominant species, ***ḥādh,*** *Cornulaca arabica* (Chenopodiaceae). ***Ḥādh*** shrublets may be spaced 3 to 20 m apart or more depending on local conditions. ***Ḥādh*** may occur as virtually pure stands covering thousands of square kilometers or have as associates *Calligonum crinitum* or *Tribulus arabicus* or *Limeum arabicum.* The sedge *Cyperus conglomeratus* is usually found with it. This community is bounded on the north at about the Twenty-third Parallel; it appears to extend south to near the limit of the sands.

1.3.9 Rubʿ al-Khālī ***ʿAbal*** Shrubland

This wide-spaced community is also found only in the Rubʿ al-Khālī, and in it *Calligonum crinitum* subsp. *arabicum* takes the place of *Calligonum comosum* of the northern sands (figs. CD.102, CD.103). *Calligonum crinitum* is accompanied almost everywhere by *Cyperus conglomeratus* (fig. CD.20) and often by *Stipagrostis drarii* and *Limeum arabicum.*

1.3.10 Succulent Halophyte Associations

A series of distinctive, often sharply zoned halophyte associations, almost always led by chenopods, is found in and around coastal salt marshes and sometimes around inland *sibākh.* They are characterized by such species as *Suaeda vermiculata, Seidlitzia rosmarinus, Bienertia cycloptera,* and *Halocnemum strobilaceum.*

1.3.11 Shrubless Community Types

There are some wide tracts in our study area that are virtually without woody plants—even apart from mobile sands, bare rock, and terrain with

other obvious limitations. The most notable examples are the ***gra'ah*** (bald) lands found in the northeastern part of the northern plains. Shrublets are absent here, and vegetation is almost entirely restricted to a flush of short-lived annuals in those years when there are good winter rains. The grass *Stipa capensis* often takes spring dominance here with *Plantago* species, *Helianthemum* species, and a variety of other annual associates.

1.3.12 Microcommunities

I use the term *microcommunities* for highly specialized associations, often related to distinct terrain forms, that may be found as islands within some of the broader community types. An example are the "***sidr*** basins" scattered through the sparse ***rimth*** saltbush country of the Ṣummān. Here, in rounded, clay-floored basins of various sizes (which may become long-lasting pools after heavy rains), are well-developed stands of ***sidr,*** *Ziziphus nummularia* (Rhamnaceae) (figs. CD.11, CD.330), sheltering associates such as *Ephedra foliata* and *Sisymbrium erysimoides.* Silt-loving herbs such as *Althaea ludwigii* and *Notoceras bicorne* occupy the open ground after rains. The ecological importance of this habitat is far out of proportion to the limited ground area it occupies, and such basins are concentration centers for birds and other wildlife as well as for the nomads' herds.

1.3.13 The Annual Cycle of Plant Growth

Throughout eastern Arabia, as in other hot deserts without summer rainfall, summer is the unfavorable season for plant growth, leading to dormancy or the evasion of the dry season by the production of seeds. The growth cycle for many desert plants thus begins in the autumn or winter rather than in the spring as in more temperate regions.

Some perennial plants in the study area show a resumption of active growth as early as September, well before the arrival of the first rains. This resumption may be associated with shortening day length, moderating temperatures, and the increase in atmospheric humidity, which has occurred by this season in coastal areas. The pace of growth quickens, however, with arrival of the first Mediterranean depression rains of the season (if they arrive at all)—usually in November or December but occasionally in

October. Such rains, if early, may lead to a flush of germinating annuals within a few weeks. If they come in December or January, cold weather may delay germination or growth much beyond that stage, until the warming of spring. Along with the germination of annuals comes a resumption of new shoot and leaf production by the perennials, many of which shed leaves or died back completely at the beginning of the previous summer.

Desert annuals may flower and set seed within a few weeks after germination, completing their life cycle in a fraction of the usual growing season of more humid environments. Some of them have apparently evolved chemical germination inhibitors or other moisture-detection devices in their seeds to protect them from the danger of germination before soil moisture levels will allow further growth (Cloudsley-Thompson and Chadwick 1964). If germination is followed by moisture stress, some plants conserve growth energy by flowering or fruiting in a dwarf size hardly as big as early seedlings under more normal conditions. In a converse manifestation of such form plasticity, growth may be prolonged, with the plants achieving unusually great stature, if rains are repeated and well spaced. Geographic areas of growth and reproduction of both annuals and perennials may be extremely patchy when rains come from small, local storms.

The annuals (if they have emerged at all in any given year) are often at the peak of maturity in March or early April (figs. CD.5, CD.6), although some species are habitually early or late bloomers. The perennials, including some grasses, usually peak sometime later. By late April or May, depending on local conditions, any annuals have withered and are gone for the season. Many perennials maintain active growth into May or June before falling again into dormancy. Some deeply rooted woody plants of tropical origin such as *Acacia* and *Ziziphus* flower and fruit in June or July or even later. Although a very few smaller perennials such as succulent *Zygophyllum* species or the semisucculent *Heliotropium bacciferum* peak in late spring or early summer, they are able to maintain some active growth through even the hottest part of the dry season. They rarely do not bear at least a few flowers or fruit.

A very clear exception in these patterns is found in the saltbushes of the family Chenopodiaceae, which are either succulents or have other highly modified, drought-resistant anatomy. These plants are in active vegetative growth during the hot season, and they flower and fruit in October and November. Some of them flower in both spring and autumn.

In closing this section, I want to emphasize that a good growth of annuals over any appreciable geographical extent in the study area is the exception rather than the norm. Given the interannual variation in rainfall and considering that a good growth of spring annuals is dependent on both the amount and the timing of cool-season precipitation episodes, it is not unusual for two or three years to go by without more than a token sprinkling of ephemerals in some very restricted areas. However, when good rains do fall widely and with good timing, the effect on the desert landscape can be dramatic. Vegetation cover, usually less than 5 or 10 percent with the widely spaced perennials, can seemingly overnight rise to approach 80 percent or more, creating a flowered carpet of rich green that stretches to the horizon. As I argue in chapter 5, these phenomena influence the Bedouins' concepts and classification of the plant world.

CHAPTER 2

The People

2.1 Bedouin Life

THE BRIEF DESCRIPTION of Bedouin life given here refers to the state of tribal affairs during the period of my primary data collection from 1960 to 1975. Many of these points are still valid today. Some changes that have taken place in more recent years, largely as a result of economic developments in Saudi Arabia, are discussed in chapter 7.

All the Bedouin tribes are characterized by a segmentary lineage system with descent reckoned strictly in the male line. Parallel segments at each level are held to stem from descendants of a common forefather, and the name of each tribal section usually includes in some form the name of this actual or supposed eponymous ancestor.

The concept of "tribe" is fuzzier in Bedouin speech than it is in English because the term *qabīlah,* usually glossed in English as "tribe," can in practice be used for smaller or larger social divisions. Confusion can arise in such cases as the Ruwalah, who are often treated as a tribe but who form part of a larger unit, the ʻAnazah, who are more often referred to in the literature as a "confederation," although the relationship of its divisions is supposedly based on ancient kinship. In practice, though, there is usually not much confusion about what constitutes a tribe, and I follow the concept as used in most of the English and Arabic literature. Each of the smaller tribal segments, usually referred to in English as a "section" or "subsection," are called in Bedouin Arabic ***fakhḏ̣, ḥmūlah,*** or ***bdīdah.***

At the lower level, near that of ***bayt*** (literally "house" or "household," in fact an extended family occupying one or a few tents), is the important concept of ***ibn ʻāmm,*** which literally means "father's brother's son" and may be used in that restricted sense. It also, however, has a classificatory reference (sometimes in the plural form ***banī ʻāmm***) to all those males descended from a common ancestor about five generations preceding the present adult generation (Cole 1975; Lancaster 1997). In some contexts, the concept can be applied in a much wider sense (Cole 1975). It can also correspond to the traditional five-generation "vengeance group" that in

long tribal custom is responsible for avenging a crime committed against one of its members or for paying the penalty for a crime committed by one of its own.

At the intertribal level, there is a widely recognized division into groups called ***aṣīl*** (“of pure lineage,” as figured by traditions of ancient genealogy) and ***ghayr aṣīl*** (non***aṣīl***). Tribes in the latter category are less numerous—for example, the Ṣulabah, Hutaym, and Sharārāt in the northwest and the Rashā’idah and the ‘Awāzim in the east. Some of these groups have historically been held in protected client status by some of the ***aṣīl*** tribes. In practice, they today suffer little prejudice in the desert scheme of things beyond the virtual impossibility of their members’ being accepted in marriage by one of the ***aṣīl*** groups.

Some tribes are considered to be more closely related than others, such as the several groups that belong to the ‘Anazah confederation or Āl Murrah and the ‘Ujmān, both of whom recognize their common descent from an ancient ancestor, Yām. These related groups may be rivals in some respects but have often assisted each other when opposed by a common enemy.

Leadership of the tribe is vested in the person called ***shaykh*** or ***amīr*** (emir), and the major sections of the tribe often also have their own leading members similarly styled but of lesser status. Ever since the central governments suppressed intertribal raiding and warfare in the 1930s, the paramount shaykh’s function is primarily to represent the tribe’s interests vis-à-vis the national government and to intercede with the government on behalf of his fellow tribesmen in personal legal cases, claims, and requests for government services. He also acts as a mediator in intratribal disputes, and there is a general preference for such differences to be settled internally in the interest of preserving tribal autonomy to the greatest possible extent. The shaykh of a tribe has virtually no coercive powers but can often be very persuasive because many depend on his mediatorial services. His position is not automatically hereditary from father to son but does generally reside within a single tribal clan, which tends to remain the same over a relatively long period, at least several generations. Succession is decided within the shaykhly clan on the basis of which senior member is considered best fitted for the job, taking into account tribal public opinion and the candidate’s reputation and influence in central government circles. Generosity and hospitality are among the highest

virtues in Bedouin esteem, and any leading tribal personality is expected to spend freely on the almost constant entertainment of visitors and to be free with what largesse may come his way.

The Bedouins' relations with their grazing lands is explored in more detail in section 4.1, but it may be noted here that neither a tribe as a whole nor its individual members or leaders "own" the land they use for livestock production. By long desert custom (and by Islamic law), grazing land is a commons for all Muslims. A tribe holds priority rights to the use of water sources in the core of its generally recognized home territory, or ***dīrah,*** but the ***dīrah*** of any tribe may be and often is used for winter and spring grazing by other groups. The use of "home" wells, even in the dry season, may also be shared when their production is adequate. The basis for tribal priority of water rights seems to be that wells are not "natural features" and that they were dug or maintained by members of the group. Thus, the stone casements of wells often bear the ***wasm,*** or camel brand, of the local tribe as a mark of ownership.

The dwelling occupied by the Bedouin household is the tent, woven of black goat hair or mixed wool and goat hair, known as the ***bayt sha'r,*** "house of hair" (figs. 3.2, CD.24, CD.38, CD.39). In eastern and northeastern Arabia, the tent is almost invariably pitched with its back to the prevailing north–northwest wind. If the wind should reverse, the back curtain can be quickly moved around to the front. The tent is divided by a vertical curtain into the men's section, or ***majlis,*** on the right end (as seen facing the tent) and the family or women's section on the left. Visitors and male friends are received and entertained in the men's section, at the front of which lies the fire, nearly always burning or smoldering, used in brewing the coffee and tea essential for hospitality (fig. 2.1). It is poor form for visitors to approach the tent from any direction except the ***majlis*** end, and they must come toward the ***bayt sha'r*** from the outer front quarter, where their approach is clearly visible, giving the women time to retire to their more private section. When nonfamily members are present, the womenfolk wear veils and generally keep to their side of the curtain but may from there sometimes participate in conversation with men known to the family. Children, including younger girls, have the free run of both worlds, and young boys are expected to assist in hospitality by helping serve the customary offerings of coffee, dates, and tea. Girls, too, must know these tent obligations. On one occasion, I called at

FIGURE 2.1. Consultant Juḥaysh ibn Muṭlaq of the Dawāsir displays coffee-making implements. These implements would normally be kept inside the face of the guest section of the tent, which is seen here end on, facing left. He holds in his left hand the ***miḥmās,*** the long-handled, heavy iron pan used for roasting coffee beans, and in his right a stack of the small, handleless coffee cups. The roasted beans are ground in the brass mortar and pestle in front of his right hand. Three beak-spouted coffee pots are in center front. Photograph courtesy of the Saudi Arabian Oil Company (Saudi Aramco).

a tent when nobody was home save a young girl of about eight years. She gravely invited me (I was quite unknown to her) to sit in the guest section, blew up the coffee fire, and with perfect poise prepared and served me coffee, dates, and rounds of tea while I waited for her father to return from a shopping trip.

Firewood, in the form of uprooted desert shrublets, is often piled around the ***majlis*** tent end and provides some extra shelter in the cold season.

Camels, taken out to graze during the day, usually by the older boys in the family, are brought in close to the tent at night, along with any family goats or sheep. The whole family sleeps in the larger, family part of the tent, and any guests are put up in the ***majlis.***

Household cooking is done at a separate fire associated with the women's tent section, and even by 1965 a few families were using kerosene or bottled gas with portable burners for this purpose. The coffee, or hospitality, fire, however, is invariably fueled with traditional desert firewood, sometimes supplemented with dry camel dung, which makes good coals.

Bedouin livestock is kept primarily for milk and milk products, which are a dietary staple. Meat is generally eaten only on special occasions, such as for the major feast days of Islam or in honor of visiting guests, when a young male goat or sheep (or very rarely a camel) may be slaughtered. Before around 1955, wild game was an occasional supplement to the Bedouin diet, with meat provided by several species of gazelle found in the northern plains or southerly sand areas. Even the oryx was still found in the Great Nafūd and the Rub‘ al-Khālī. The main quarry among the birds was the ***ḥbārā*** (the houbara bustard, *Chlamydotis undulata*), which was hunted with falcons. By 1960, most of the larger game had been hunted to extinction or near extinction by motorized hunting parties, often groups of the royal families of Saudi Arabia and neighboring gulf states using semiautomatic or even automatic firearms. The average Bedouin was thereafter reduced to coursing hares with his ***slūgī,*** a fast, greyhoundlike hunting hound) (fig. CD.25) or bagging an occasional bustard, itself now rather scarce. Protein input was also supplemented by more lowly fare, including the desert locust *(Schistocerus gregarius),* of which huge swarms arrived in some years to decimate desert as well as farm vegetation. The large, spiny-tailed vegetarian lizard, ***ḍabb*** (pl. ***ḍubbān***), is considered edible (fig. CD.42). I discuss wild plants used in the tribes' diet in section 4.3.

Since about the time of World War I, rice has supplanted wheat as the staple starch. A typical family meal of above-average fare might consist of fresh or soured camel milk and a pot of rice boiled with onions and a tin or two of tomato paste. Thin unleavened wheat flour bread may be made on some occasions. Dates are also considered to be a staple and are often purchased semidried in large compressed blocks or sacks that keep well for months due to their high sugar content. In the past, fresh fruit, such as imported apples and oranges, were occasionally purchased in the

towns, and the children considered them to be great treats when as a tent visitor I brought them with me in the 1960s; such fruits are much more common now.

The Bedouins' dependence on the products of the towns has been noted in literature since at least the time of the Islamic philosopher-historian Ibn Khaldūn (A.D. 1332–1406) (Ibn Khaldūn n.d.) and has been studied in more recent times (Khazanov 1994). The Bedouins in the study area in fact rely on village and town markets for virtually all of their foodstuffs except milk products and meat. Regular purchases include coffee, tea, sugar, cardamom (an essential spice used in Arabian coffee), dates, rice, onions, tinned tomato paste, as well as small items such as salt and matches. Essential hardware likewise is purchased in town, including housing materials such as tenting strips, poles, ropes, and iron stakes as well as coffeepots, teapots, metal bowls for milk, cooking pots, knives, flashlights and batteries, stoves and petroleum fuels (if used). The majority of these market items—even traditional ones such as the ***ghuṭrah*** (men's head cloth) and house wares such as tent material and the brass pots and mortar and pestle used in coffee making—are now imported from outside the kingdom, usually from other Asian countries. Clothing may be purchased ready made in the towns, but the women often make their own and children's garments themselves from purchased material. I used to bring families gifts of flower-print material after being coached in advance by the husband on the favorite patterns. And I remember finding a broken, sand-polished, hand-crank Singer sewing machine on an abandoned Bedouin campsite.

I acquired several samples of the beautiful weaving done by Bedouin women on a flat loom staked out on the sand. The weavings were the colorful, patterned, elongated wool rugs called ***sāḥah.*** These rugs may be used as ground cloths (fig. 2.2) or sewn together to make tent partitions. They may also be sewn into camel bags or general storage bags (fig. CD.31).

The menfolk seldom demonstrate much in the way of handicraft skills. Metal work, as for making knives and other implements, is held to be a low-caste trade associated with the non***aṣīl*** tribes such as the Ṣulabah. South Arabian tribesmen of the southern Rubʿ al-Khālī whom I met appeared to be more self-sufficient, and a Rāshidī from those parts taught me how to braid wool and leather into halters and leads for camels. Within our study area, even the lowly camel stick, not to mention more complicated items such as riding and pack saddle frames, is purchased in

FIGURE 2.2. Consultant Muḥammad ibn Khurṣān of the Qaḥṭān tribe *(second from right)* joins relatives camped near Dhahran to show the author some camels they had for sale. The rug they sit on is a hand-woven Bedouin ***sāhah.*** An elder son *(left)*, as is customary, has been assigned to pour the rounds of coffee, 5 July 1961.

town rather than made at home. That the Bedouins buy rather than make such objects should not be taken as a measure of the average Bedouin's mechanical aptitude. Some of them had acquired motor vehicles as early as the 1960s, usually in the form of light trucks retired from oil company service and sold at low cost to employees. Several of my Āl Murrah acquaintances of this period became quite adept in dealing with a balky internal combustion engine or broken running gear.

At the time of my data collection, virtually all Bedouins were nonliterate, but they were certainly not without literature. Poetry is the prime art form among them, and almost any tribesman can recite from memory long poems on themes ranging from love to tribal warfare. Some are also skilled raconteurs of the ***sālfah,*** a genre of historical narrative describing famous events and personages of the past (Ingham 1997, 144–69). Many a long evening around the coffee fire begins with the request ***"Inshid!"*** "Give us a poem ***(nshīdah)***!"

Bedouins have sometimes been described as being lax in the observance of Islamic religious obligations. This may well have been the situation in some parts of the peninsula in not-so-distant times. Alois Musil, for example, in his meticulous and extensive ethnographic description of the Ruwalah of the period from 1908 to 1915, has no chapter or section on and few references to religion in the orthodox sense, although he devotes two chapters to the supernatural and the spirit world (Musil 1928a). The Ruwalah have been described more recently as being not much concerned with the formal aspects of religion (Lancaster 1997, 52). My experience has been much the contrary among the eastern and northeastern Arabian tribes. All the people that I worked with, visited, or traveled with were always punctilious in their execution of the five obligatory daily prayers and in keeping the fast of Ramadhan. Their speech was constantly sprinkled with pious expressions, and many individuals, although illiterate, could quote some parts of the Qur'an. Their somewhat puritanical outlook today (still balanced by a great deal of common sense) was doubtless generated in large part by the Unitarian movement that was given such emphasis in the alliance of the Āl Sa'ūd ruling family with partisans of the reformer Muḥammad ibn 'Abd al-Wahhāb (Rentz 1960, 554). Although the *ikhwān* settlement plan (described in the next paragraph) did not take permanent root among Bedouins, the revival of orthodox religious ideas obviously did. This influence was far less pervasive in the far northwestern parts of the present kingdom, probably accounting for the apparently more relaxed attitudes in that region.

The central government of Saudi Arabia has made several attempts, for reasons of political expediency or simply for "modernization," to induce the Bedouins to adopt a settled life based on agriculture. The first attempt, promulgated during the first quarter of the twentieth century, was a religion-oriented scheme generally known in Western literature as the "*ikhwān* movement." Beginning around 1912, King 'Abd al-'Azīz

Ibn Sa'ūd sent religious leaders out to the tribes to preach the virtues of a settled life based on the ultraconservative Unitarian tenets of the eighteenth-century reformer Muḥammad ibn 'Abd al-Wahhāb. Parcels of land with water wells, usually lying within the traditional territory of each tribe concerned, were assigned as *hujar* (sing. *hijrah,* "place of refuge, settlement") where the tribesmen were to live as *ikhwān* (brethren) in a pious life based on small-scale farming (Philby 1955, 261–64). Many such settlements were established in diverse parts of the kingdom, but none of them involved more than a small portion of each tribe's membership, and many of them were abandoned within a few decades.

One of the more important "modernizing" plans for Bedouin settlement was attempted in the 1960s as the Fayṣal Settlement Project, named after King Fayṣal, who acceded to the throne in 1964. The plan was to settle, over a five-year period, some one thousand Āl Murrah and ad-Dawāsir families on 10,000 acres to be put into cultivation in the Wādī as-Sahbā' basin in the Eastern Province. Irrigation water was supplied by fifty pumped wells, and costs for the first five years' operation were approximately $39 million (Mandaville 1965a). Despite optimistic preproject surveys carried out among the Bedouins (during a particularly severe drought period), members of neither tribe were finally willing to become farmers in practice. The project was completed but in the end turned over to commercial farming interests that used non-Bedouin labor in the large-scale mechanized production of alfalfa hay and other fodder for sale on the market.

A settlement scheme in northwestern Saudi Arabia in the early 1960s to assist the drought-stricken Sharārāt tribe in Wādī as-Sirḥān also came to naught (Mandaville 1965a). However, later Bedouin settlement and assistance projects in the far northwestern part of the country have reportedly been more successful, and Donald Cole and Soraya Altorki (2000) describe some aspects of Bedouin settlement in al-Qaṣīm through a more natural, evolutionary process facilitated by government-financed loans for agricultural projects and family housing. The latter approach, in my experience, has been typical of more recent developments kingdomwide.

2.2 Bedouin Tribes

In the next few sections, I give summary descriptions of the tribes involved in my ethnobotanical data collection, arranging them in rough order of

their importance as sources for my data. The first two groups listed, Āl Murrah and Banī Hājir, contributed more than all the others combined and are therefore described in greater detail. Population figures should be taken as order-of-magnitude estimates because tribal census figures, if they exist at all, are not available. The general locations of the tribal home ranges are indicated on the study area map, figure 1.1.

2.2.1 Āl Murrah

Āl Murrah (sing. Marrī) form one of the most important tribes in eastern Saudi Arabia and are unusual in several respects. Perhaps more than any other group, they maintained their camel-herding nomadic ways, holding out against a general tendency to sedentarization in the growing oil economy of Saudi Arabia. Their primary ***dīrah*** is bordered roughly in the north by the latitude of al-Ḥasā oasis and extends south to the central Rub‘ al-Khālī. The Dahnā’ sand belt runs along its western edge, and to the east it extends beyond the base of the Qatar Peninsula. One of the more frequent Āl Murrah ranges lies between the Fiftieth and Fifty-second Meridians, along the line of water wells that forms a main north–south crossing route of the Rub‘ al-Khālī. The tribe, although primarily a deep sand–dwelling group, has the most extensive range of movement of any tribe in the east or northeast, and its members may be found during the winter grazing season almost anywhere east of the Dahnā’ sands from the central Rub‘ al-Khālī to the borders of Iraq in the north.

Āl Murrah had an earlier home in southwestern Arabia in the vicinity of Najrān, although the date of their migration to the tribe’s present range in the east is not known. They claim kinship with a group in the Najrān area, and, as noted earlier, they consider themselves closely related to the ‘Ujmān tribe on the basis of common descent from an ancient ancestor, Yām (Rentz and Mulligan 1950). At various points, estimates of the tribal population have ranged from five thousand (Philby quoted in Rentz 1957, 89) to twenty-eight thousand (Matthews 1960, 58). Cole’s (1975) figure of fifteen thousand appears reasonable. The tribe has seven to nine main sections arrayed in two major descent groups. The paramount shaykhs come from the Āl Fuhaydah section, and, according to my last notes (of 1981), the incumbent then was Fayṣal ibn Muḥammad ibn Lāhūm ibn Shuraym, frequently referred to simply as “Ibn Shuraym.” He replaced his

cousin Ṭālib ibn Rāshid, who died 15 December 1980. Fayṣal also became commander of the central government's Fortieth National Guard brigade.

The women of Āl Murrah appear to have a freer and more open social role than in many tribes. In my experience, it is the only tribe of our study region in which a man's commonly used name may include a matronym referring to his mother or grandmother (my consultants Sālim ibn Miznah and ʻAlī ibn Fāriʻah are examples; their fathers were named "Ḥamad").

Āl Murrah have a particularly high reputation as trackers and guides in eastern Arabia, and the central government's emirs in major Eastern Province towns still maintain Marrī trackers on call to help apprehend criminals, the tracker's testimony being accepted in courts of law as that of an expert witness. One couplet (Rentz and Mulligan 1950, section Al Murrah, 5) generally known in eastern Saudi Arabia refers to the government's methods of tracking down lawbreakers:

Fis-samā barqīyah	In the sky, radio telegraph
fil-arḍ marrīyah	On the ground, Marrīs

One section of Āl Murrah seasonally visited the derelict oasis of Yabrīn on the northern edge of the Rubʻ al-Khālī to collect dates from the semiwild palms growing there near slow-flowing springs. Two *hujar,* settlements, were established there by the same people during the heyday of the *ikhwān* movement. Āl ʻAdhbah section also established colonies at Nibāk and as-Sikak, near the base of the Qatar Peninsula. All four settlements are now inhabited by members of the original groups and have grown to small villages with schools and other government services.

2.2.2 Banī Hājir

Banī Hājir (sing. Hājirī) still remember Tathlīth, in the southwestern mountains of Saudi Arabia, as their original home, and they consider members of the Janb tribe there as their relatives. Their move to eastern Arabia may have taken place two or three hundred years ago. They also claim a close relationship with the Manāṣīr, who now range in the present territory of the United Arab Emirates (Rentz and Mulligan 1950; Rentz 1957). Banī Hājir ranged primarily in and east of the Qatar Peninsula until about 1900, when the greater portion of the tribe moved west as a result of a dispute with Āl Thānī, the Qatarī ruling family (Rentz and Mulligan 1950).

Since then, their ***dīrah*** has lain primarily in the sand dune area known as al-Bayḍā’, which extends from the vicinity of al-Jubayl on the Saudi Arabian coast south to around al-‘Uqayr. In addition, as a reward for their loyalty and military services in the cause of the Sa‘ūdī royal family, they were assigned settlement rights in the area of al-Jawf (Jawf Banī Hājir), west of the present oil town of Abqaiq (Buqayq). Here several of the Banī Hājir’s leading shaykhs established *hujar,* which the tribe later abandoned then reoccupied.

Banī Hājir include fourteen major tribal sections, including al-Makhaḍibah (or al-Makhāḍīb), in which lies the shaykhly clan, ash-Sha‘ābīn. In 1982, the incumbent paramount shaykh was Ḥamūd ibn Shāfī ibn Sālim, who succeeded his father upon the latter’s death in Kuwait during the winter of 1955–56. The members of Banī Hājir were in the early 1960s estimated to total some fourteen thousand (Matthews 1960, 58).

Banī Hājir often camp outside their ***dīrah*** proper, sometimes with ‘Ujmān groups to the northwest, sometimes with the ‘Awāzim in as-Sūdah, near the former Saudi Arabia–Kuwait Neutral Zone. The tribe raises both camels and sheep. My primary consultant in this tribe, ‘Alī ibn Sa‘īd of al-Makhaḍibah, took pride in his fine riding camels of ‘Umānīyah stock.

2.2.3 Al-‘Ujmān

The ‘Ujmān (often written “‘Ajmān”; sing. ‘Ajmī in either case) are an important tribe of eastern Saudi Arabia, with a ***dīrah*** centered on the district known as Wādī al-Miyāh (which is not a true wadi, or seasonal watercourse, but rather a wide, elongated depressed area along the eastern edge of the Ṣummān plateau). A significant portion of the tribe has become settled or semisettled in the series of Wādī al-Miyāh villages stretching from an-Nu‘ayrīyah in the north to ‘Uray‘irah in the south. Estimates of the population of the tribe ranged in the early 1960s from 15,400 to 28,000 (Matthews 1960, 58). The ‘Ujmān have six main divisions and twenty-four sections (Rentz 1951). The paramount shaykh, generally known as Ibn Ḥithlayn, is the shaykh of the section Āl Mu‘īḍ. Rākān ibn Ḍīdān Ibn Ḥithlayn was still alive in 1975, although his son (another Ḍīdān) was then assuming many of his leadership functions. As noted earlier, al-‘Ujmān are related to Āl Murrah and, like them, have migrated to eastern Arabia from their ancestral home in the vicinity of Najrān in the southwest. Bruce

Ingham (1994) places their subdialect along with that of Āl Murrah and Qaḥṭān in the southern Najdī Arabic group.

2.2.4 Qaḥṭān

Qaḥṭān (sing. Qaḥṭānī) are another of our consultant-contributing groups whose subdialect is classed as southern Najdī. A major portion of the tribe is settled as villagers in their early homeland in southeastern Ḥijāz, and Bedouin sections range up through southern Najd. Some of them have taken jobs in the oil industry towns of the Eastern Province, and some of their leaders have commanded National Guard brigades assigned there. Their numbers were estimated at twenty-eight thousand in the early 1960s (Matthews 1960, 58), and their paramount emir was said in 1961 to be Khalīl ibn Nāṣir Ibn Qarmalah of Āl Saḥmā'.

2.2.5 Ad-Dawāsir

Ad-Dawāsir (sing. Dawsarī) are a large and now widespread group with a historical center in the Wādī ad-Dawāsir area of southern Najd but broadly extending up into central Najd. Large portions of the tribe have long followed a settled life, but in the early 1960s perhaps one-third of its total population of some thirty-five thousand was nomadic (Matthews 1960, 57). An important Dawsarī family, the Sudayrīs (as-Sadārā), has married into the Saudi ruling family and has contributed many able governors and other officials to the provinces of the kingdom. The tribe has two main divisions and many sections and has long had a connection with the gulf area, where in earlier times some of its members worked as pearl divers. They were also instrumental in founding now important coastal cities such as ad-Dammām and al-Khubar (Rentz 1965). Among their important *shuyūkh* (shaykhs) in 1972 were Muḥammad ibn Uqayyān Ibn Naṣṣār of al-Ghayāthāt, located at al-Kharj, and Shaybān ibn Bādī Ibn Quwayd of al-Masā'irah at al-Quwayz in Wādī ad-Dawāsir.

2.2.6 Shammar

Shammar (sing. Shammarī) are usually described in two groups, one of which for some two hundred years has been located in northern Iraq (the

"Eastern Shammar"). The Shammar of Saudi Arabia are centered in the area of Jabal Shammar in northern Najd, which includes the important town of Ḥā'il. Here was located the capital of an important Shammar family, the House of Rashīd, who were longtime rivals of the House of Sa'ūd for mastery of central and northern Arabia and who were not subdued until 1921. The tribe has long had settled elements at Ḥā'il and in villages around Jabal Salmā and Jabal Ajā. The population of the Saudi Arabian Shammar was estimated in the early 1960s at some thirty-five thousand (Matthews 1960, 56), with four main sections. Shammar speak the northern variant of Najdī Arabic, and their plant terminology displays some interesting variations from the usual central and southern patterns.

2.2.7 Ar-Ruwalah

The Ruwalah (sing. Ruwaylī) are an important and very large tribe of far northwestern Saudi Arabia and the greater Syrian Desert. They were large-scale camel breeders until the early 1960s, when a major drought across northern Arabia caused great livestock losses and led to greater dependence on sheep herding and more settled modes of livelihood (Lancaster 1997, 99–100). The Ruwalah form an important part of the 'Anazah, which is sometimes described as a tribal confederation, sometimes as a tribe with major divisions. The Ruwalah's ***dīrah*** in the recent past has included the areas of Taymā and Khaybar, Wādī as-Sirḥān, and the Ḥamād and al-Widyān districts of Saudi Arabia's northwestern borderlands.

Czech historical geographer Alois Musil made several lengthy field trips with the Ruwalah between 1908 and 1915 and left a most valuable account (Musil 1928a) of their way of life at a time before the introduction of the automobile and before post–World War political arrangements began making inroads into traditional Bedouin ways. Musil also collected botanical specimens and vernacular plant names, leaving in his works a unique means of gauging some aspects of change in this group's ethnobotanical knowledge.

The shaykhly family of the Ruwalah is that of Ibn Sha'lān of al-Mur'āẓ. Their chiefs have at times maintained close ties with Syria, some of them having been members of that state's Chamber of Deputies. In more recent years, they have increasingly thrown in their lot with the government of Saudi Arabia and have played important roles in that country's National

Guard organization (Lancaster 1997). The tribe's population has recently been estimated as between a quarter and half a million (Lancaster 1997).

2.2.8 Banī Khālid

Banī Khālid (sing. Khālidī) are historically one of the most important tribes of northeastern Arabia, their shaykhly family of Āl Ḥumayd (often known as Āl ʻUrayʻir) having virtually ruled the gulf coast and hinterland for major periods from the sixteenth to the eighteenth centuries. This ascendancy was broken with their defeat by the first Saʻūdī state in 1793, but they continued to play an intermittent role in the provincial politics of al-Ḥasā province until 1913, when the region was added to the growing domains of ʻAbd al-ʻAzīz Ibn Saʻūd (Di Meglio 1978). The tribe, with six main sections, is now largely settled, with major numbers inhabiting the village of ʻAnik in the al-Qaṭīf oasis. They also own lands associated with two of their *hijrah* sites on the coast north of al-Jubayl. The leading personalities of Āl ʻUrayʻir, after submitting to Saʻūdī rule, intermarried with the Saʻūdi royal family and took up residence in the capital city of Riyadh. Their most notable leader there in the early 1970s was Nā'if ibn Muḥammad Ibn ʻUrayʻir. C. D. Matthews estimated the tribal population as seven to eight thousand (1960, 58).

2.2.9 Muṭayr

By tradition, the original homeland of Muṭayr (sing. Muṭayrī) was in the Ḥijāzī uplands between Mecca and Medina. They moved east into central Najd, whence they were displaced by the ʻUtaybah into their present ***dīrah*** farther to the northeast between al-Arṭāwīyah and Ḥafar al-Bāṭin (Ingham 1993). Their range includes the village of Qaryat al-ʻUlyā and the wells known as Ṭiwāl Muṭayr (the Deep Wells of Muṭayr), among which are al-Lihābah, al-Liṣāfah, al-Qarʻah, and Wabrah. Some members of the tribe have in recent years settled in villages established at these traditional summering places. The Muṭayr have two main divisions, each with three sections. One of these sections, al-Muwahah of ʻIlwā, includes the shaykhly clan the Dūshān (Rentz 1951). The paramount shaykh in the 1960s and early 1970s was Bandar ibn Fayṣal ad-Dawīsh. Matthews estimated the tribal population at about thirty-five thousand (1960, 57).

CHAPTER 3

Stars, Land, and Plants

An Annual Round of Bedouin Life

THE STORY LINE GIVEN HERE—the inset parts in this somewhat unconventional chapter—involves fictitious names and imaginary events but is based largely on personal experience and field notes. Its objective is to provide a more intimate feel for some aspects of Bedouin life than is provided elsewhere in this study. Plant uses and terminology are treated here only in brief because they are discussed in more detail in other chapters.

> It is mid-September, three hours after sunset, in a small Bedouin encampment situated some 70 km from the Persian Gulf coast in eastern Saudi Arabia. A fire is burning in front of the eastern, guest end of one tent that is a bit larger than the others. Men's voices, a little excited, are heard, and someone puts another piece of brushwood on the fire, raising sparks. [Figure 3.1 (in color as fig. CD.41), showing two of my consultants, is an example of such a scene.] Only a young boy in the group is standing, and in the reflected light of the fire one can see the brass coffeepot in one of his hands, the stack of small, handleless porcelain cups in the other. It is his job to keep the elders supplied with the cardamom-flavored brew, and he takes his task seriously.
>
> There are six families in six tents here, all of the Ghayāthīn section of Āl Murrah. A few years ago their summer camp would have been at one of the hand-dug groups of wells farther inland, perhaps among the clean white sand domes of ʻIrj, over against the edge of the Ṣummān plateau. This year they moved east on the advice of a kinsman who had taken a job as a watchman at a new oil facility built by the Americans. He had told them that a new water well was drilled here last winter and that if they got there early, they could choose the best place to pitch their tents for the summer near the new steel water trough. The oil company operations people had learned years ago to install a camel trough at all new remote facilities. Whenever they hadn't, the local Bedouins would appeal to their paramount shaykh, who in turn would

FIGURE 3.1. Consultants *(from left)* Khulayf of the Shammar tribe and Muḥammad ibn Khurṣān of Qaḥṭān at the coffee fire. Photograph courtesy of the Saudi Arabian Oil Company (Saudi Aramco).

visit the government's emir of the Eastern Province, Ibn Jiluwi, who would politely request the company government relations man to see to the necessary. The relations man, dropping the emir's magic name and using his own contacts with higher management, never failed to convince the construction boss.

The Bedouins call this place *"**nimrat ithnēn**"* (Number Two, having simplified the formal English name "'Ayn Dar Gas-Oil Separator Plant Number 2"). The water from the deep well here is warm and brackish, but it's more than good enough for camels, and, most important, it's virtually inexhaustible and delivered through a pipe to a watering trough. No long hours this year hoisting hundreds of leather buckets of water in the summer sun. Another advantage is that the summer people's cousin, the watchman, has access to a telephone. He is supposed to use it only for "official" purposes, but no one complains if once in a while he calls up one of the few other Marrī employees in the company—most of them drivers of oil-exploration vehicles—for tribal news.

The talk around the campfire this night is sparked by an important event of the early morning. Before first light, after the little group had chanted their predawn prayers on the sandy rise near the tents, they turned left to look south as they had every morning for the past week. Raising their hands to shield their eyes from the glare of ***nimrat ithnēn***'s gas flare less than a mile away, they had finally seen it: a star very low in the sky. It was bright but flickered deeply through the thick atmosphere near the horizon. True, they had already heard about it from fellow tribesmen camped farther south and inland, where the air was clearer. But that's never quite the same as seeing it oneself. The new year had truly begun.

For these Bedouin households, the "beginning of the year" meant the beginning of the annual pursuit of desert vegetation, essential for their herds and livelihood. The official Islamic calendar used by the Saudi Arabian government is based on lunar months, leaving their year eleven days short of the Western calendar year based on solar time. A given lunar date thus falls eleven days earlier each year on the solar calendar and moves through the seasons, repeating the cycle every thirty-three years. This system is of little use to people concerned with plant life linked to the seasons by rainfall, day length, and temperature. The Bedouins have thus always largely ignored the official calendar except for the observance of religious obligations such as the fast of the month of Ramadhan and the pilgrimage to Mecca. Even before the transistor radio, these requirements could easily be met by glances at the phase of the moon and occasional village market checks on the official date.

The Bedouin year has always been reckoned by the stars and thus remains synchronized with the seasons and the annual march of desert plant and animal life. The year consists of four main seasons: ***aṣ-ṣfarī*** (corresponding to the season autumn to early winter), ***ash-shitā*** (deep winter to early spring), ***aṣ-ṣēf*** (later spring and early summer), and ***al-gēḏ*** (the hottest part of the summer). Some northern tribes add one or two additional season names, using terms derived from important star signs of the periods. The year is also divided into shorter periods marked by the heliacal rising (or more rarely risings or settings at sunset) of single stars or asterisms. The heliacal rising is the first appearance of a star during the year as it is seen to rise above the eastern horizon before sunrise. Each day thereafter it will appear higher in the sky. Some of these named periods or stellar events correspond to the ancient *manāzil al-qamar,* "mansions of the moon," which divide the year into twenty-eight named periods of thirteen days each and which are still observed by seafaring folk of the Persian Gulf (Serjeant 1968).

The numbered years that are part of the Islamic calendar system were also little known to the Bedouins, who relate events to mnemonic year names based on widely known happenings. Some of these names refer to important historical events, others to unusual weather phenomena. Given the importance of grazing conditions in the Bedouin economy, it is perhaps not surprising that many year names are also concerned with unusual developments (or failures) of wild plants. Actual year names quoted by my consultants, always given in the form "***sanat*** . . . ," "year of . . . ," have included:

sanat sbilah, year of the 1929 battle at Sabalah, where Ibn Sa'ūd defeated the rebellious Bedouin *ikhwān* forces of the Muṭayr tribe and their allies
sanat as-skhūnah, "year of the fever," when sickness was widespread
sanat al-jrād, a year in which there were many swarms of desert locusts ***(jrād)***
sanat al-khzāmā, a year, around 1950, in which the annual plant ***khzāmā*** (*Horwoodia dicksoniae,* Cruciferae) was unusually prevalent
sanat rabī' al-'arfaj, a year when there were no annual plants in the spring period, but the ***'arfaj*** shrublets (*Rhanterium epapposum,* Compositae) flowered profusely
sanat al-ḥalam, a year in which the dwarf shrublet ***ḥalam*** (*Moltkiopsis ciliata,* Boraginaceae) germinated and grew in great numbers

sanat aṣ-ṣiffār, a year in the 1960s when the annual plant growth consisted largely of the cruciferous annual ***ṣiffār*** *(Schimpera arabica)*
sanat ḥājj al-ghanam, "year of the pilgrimage of the sheep," a year in the 1960s when grazing was so plentiful in the northern plains that scores of truckloads of sheep were sent northwest on the Trans-Arabian Pipeline road, reminiscent of the great bus caravans seen each year taking pilgrims to Mecca

The star for which the Āl Murrah were watching at ***nimrat ithnēn*** was ***sihēl,*** or Canopus. Throughout much of Arabia, the appearance of ***sihēl*** marks the end of the severest part of summer and the beginning of the ***aṣ-ṣfarī*** season (autumn). In central Arabian latitudes, Canopus is above the predawn horizon before the end of August, but two or three weeks more usually pass before it becomes visible above the haze and obstructions near the horizon. Nothing dramatic happens with the weather at that time. In fact, high heat and in the gulf coast region high humidity continue into October. In everyone's mind, however, summer heat is now winding "down" and thoughts turn to autumn travels in search of the first rains and early grazing. One of my consultants of the Banī Hājir provided the following couplets celebrating the rise of this star:

Tbayyan sihēl wa rā'ī al-bil 'adā il-mafrūd
walā 'ād rā'i ṣ-ṣēd yagnaṣ al-mishrābah

Canopus has appeared, and the herdsman keeps away the young camel [from its mother]
And the hunter has not returned seeking drink

The cooling season is marked here by noting that this is the time to wean the young camels born in the previous season and that the hunter need no longer interrupt his expeditions to return for water. Another verse says:

Ya sihēl al-jnūbī bardak yījī nasnās
ya ḥabbnī liṭ-ṭayyib law min ba'īd an-nās

Oh Canopus of the south, your cold comes as a cool breeze
You who have loved me as a good [man] though so far from mankind

Yet this time was traditionally also the season of ***dhalgat sihēl,*** "the sword point of Canopus," the time when a visit to the al-Qaṭīf or al-Ḥasā

oases could result in infection by ***al-wubā,*** "the pestilence," probably a reference to the endemic malaria that afflicted those areas until about the 1960s.

> The men around the campfire at ***nimrat ithnēn*** that September evening are also discussing plans for their annual migration to the northern plains, where the autumn rains, ***al-wasmī,*** usually come earliest (if they come at all). The ***wasmī*** seldom arrive even in the north before the latter part of October, so there is plenty of time for preparations—overhauling the camel gear, resewing the seams of the black hair tents, and purchasing supplies. Sālim, one of the younger men, says he will move out by the time of the first possible ***wasmī,*** firm news or not. He will act as the group's ***'assās*** (pl. ***'awāsīs***), rain and pasturage scout, and get back word as soon as he has firm knowledge of any northern rains.
>
> The elder brothers in the group, 'Alī and Fayṣal, remembering the hardships of the previous year when there was no ***wasmī*** rain at all, say they will stay put until they have sure news. Their herd of fifty big ***majāhīm*** (sing. ***mijhim;*** the strain of heavy, near-black camels known for their high milk production) can still make do with the remaining dry stubble of ***thmām*** grass and occasional moves over to the saltbush grazing in the lowlands 15 km to the east.
>
> The womenfolk start getting the tents ready for the move north, making plans for a communal tent-sewing session to strengthen the seams that join the ***faljān*** (strips of tent material) into larger pieces. They also check the poles and ropes (fig. 3.2) so that they can tell their husbands what needs buying in the Thursday market at al-Hufūf.
>
> The ***wasm*** rains might come up north as early as late October if they are lucky, and by the middle of that month, with the rise of the Pleiades ***(ath-thrayyā)*** above the eastern horizon at evening prayers, when the ***wasm*** season officially begins, they are eagerly questioning any travelers from the north.

The Bedouins always associate the Pleiades with the winter rain season and auspicious times. The Pleiades' rise at the time of evening prayers, about two hours after sunset, heralds the coming of the cool season, and their setting at that time in May marks the beginning of summer heat. An Āl Murrah proverb says:

FIGURE 3.2. Erecting the "house of hair." Young daughters of a Marrī consultant pull on a guy rope while their mother drives a stake.

Ila* [*sic*] *badat ath-thrayyā i'shā dawwir li'yālak ad-difā
wa idha ghābat ath-thrayyā i'shā dawwir ldhōdik ar-rishā
ḥidd ya rā'ī ash-shiyāh

If the Pleiades start their course at evening prayer, look for warm clothing for your family
And if the Pleiades are setting at evening prayer, look for the well ropes for your camel herd
Oh, herdsman, get the ewes in [and ready to be bred]

Wasm rains in October or November bring special excitement and much praise of providence among the Bedouins because they are an essential (although not sufficient) condition for the fullest possible development of grazing vegetation. In addition, they are considered essential for the growth of ***fag‘,*** the prized desert truffles that the Bedouins collect to eat. After autumn rains, the desert annuals germinate but grow only a little. Their growth is then interrupted by low winter temperatures even though additional rain may fall, it is hoped, in December and January. The warmer days of spring lead to rapid growth of both annuals and perennials, and if additional rain falls then and keeps the ground moist, the annuals develop great density and stature. If there are no rains until late winter or spring, the annuals are not able to grow to full size before they are withered by the quick rise of temperature in late spring and early summer.

> It is the first week in November, just after the first cold front has moved in from the northwest bringing a temperature drop and the first real change in the weather. The group at ***nimrat ithnēn*** is again at the evening coffee fire and well settled after the first three cups when Sālim, having saved his words for best possible effect, says simply: “News from the north.”
>
> All eyes turn. “What news?”
>
> ***“Al-barakah. ‘Ulūm min Fēsal. Jāhum sēl fil-gra‘ah”*** (Blessings. News from Fayṣal. They’ve had heavy rain in the Qar’ah).
>
> ***“Al-ḥamd lillāh. Waysh ḥafrathā?”*** (Praise be to God. How deep is it?)
>
> ***“Dhirā‘, al-ḥamd lillāh”*** (Arm deep, praise God).

The question “How deep is it?” (literally “What is its digging?”) does not refer to a depth of standing or running water but to the depth of moisture in the ground. When rain falls on sand, it percolates downward until a well-defined front of wet sand reaches an equilibrium depth directly proportionate to the amount of rain that has fallen. The standard Bedouin method of measuring and reporting a rainfall is to dig a hole straight down with one hand until the finger tips reach the front with dry sand, which is always clearly defined. The depth is then reported (in terms of higher and higher marks on the hand and arm) as ***aṣābi‘*** (to the base of the fingers), ***kaff*** (the middle of the palm of the hand), ***mi‘ṣam*** (to the wrist), ***maṭlā*** (to the place where a woman’s bracelet is worn, about 8.5 cm above the

wrist), ***dhirāʻ*** (to the thick part of the arm), ***kursūʻ*** (to the elbow), ***maʻḍad*** (to the upper arm between elbow and shoulder), or even ***mankib*** (to the shoulder).*

As might be expected, the Bedouins also have a well-developed terminology of rain types. The term ***sēl,*** used in the conversation given earlier, means the flow of water in rivulets and runnels across the ground in amounts up to and including flash floods and indicates that rainfall was heavy enough to cause such effects. Rains are classified according to season, such as ***wasmī*** (of the ***wasm,*** autumn), ***shitwī*** (of the winter), and ***maṭar as-smāk*** (of spring, of the star sign ***as-smāk***). A light early rain in the fall is a ***daʻth.*** According to intensity, it may be a ***thinnīt*** (a drizzle), a ***rishshah*** (a sprinkle), a ***hamlah*** (heavier but without thunder), a ***mkhīlah*** (thunderstorm cell), or a ***waddān*** or ***wādish*** (a long, slow rain). A rain restricted to a certain area is a ***shakhat.***

> The place where Sālim reports rainfall, in al-Qarʻah (literally, the "Bald Lands"), is a wide area up in the northern gravel plains where there are no perennial plants except for thinly scattered ***ḥalam,*** a rough-textured dwarf shrublet (fig. CD.240) seldom reaching 30 cm in height. The Qarʻah is not a favorite grazing ground. Firewood has to be carried in from other regions, and the dominant plant in spring is the coarse annual ***ṣamʻā*** grass (fig. CD.310), the ripening heads of which have barbed awns that catch in the mouths of livestock. Nevertheless, the group at ***nimrat ithnēn*** decides to move up there immediately. They will camp on the boundary between al-Qarʻah and the ***rimth*** saltbush country, along the old automobile track to Kuwait. They can use ***rimth*** for fuel, and the young ***ṣamʻā*** and other annuals will soon provide some fresh grazing. They hope they will learn about other rains in areas with more productive vegetation.

*J. L. Cloudsley-Thompson and M. J. Chadwick state that the depth of such rain percolation in dry sand is "something in the order of eight times the immediate precipitation" (1964, 23). This description closely approximates my own experience. On 27 November 1967, I dug ten test holes in fairly flat, medium-textured sand terrain near Abqaiq (Buqayq), Saudi Arabia, after four days of moderate, intermittent rains, the first of the season. The total precipitation gauged at Abqaiq by the Arabian American Oil Company was 0.51 inches. The depth of the moist-dry boundary ranged from 3 to 6 inches, apparently depending on local slope. Six of the ten measurements fell within the range 3.5–4.5 inches, and the average of all was 4.0 inches.

Three days later Sālim and ʻAlī's families, having packed the tents and all belongings on several of the larger male camels, move off to the northwest. The first day will be an easy one, and they stop after covering some 35 km in the area called al-Ḥabl. The camels will not need water for another two days, and they can graze on what little is left of last year's ***thmām*** grass. The women like the area not only for the grazing but for the scattered ***ʻabal*** shrubs (fig. CD.99) that provide excellent, clean-burning firewood. Collecting fuel is one of the women's jobs. The group does not put up the heavy, main goat hair tents for this brief stop; instead, they use a light canvas fly over two poles. They travel nearly 50 km the next day, still in al-Ḥabl. The following day finds them camping within the southeastern edge of the broad lowlands known as Wādī al-Miyāh (Valley of the Waters, so called although it is not a true wadi because of its shallow water table with many brackish wells). They are in the home territory of the ʻUjmān tribe, but the ʻUjmān are ancient kinsmen of Āl Murrah, and the traveling party make a point to call at tents for coffee and intelligence. These lowlands have ***rimth*** saltbush (fig. CD.195) as the dominant shrub cover, and the ***rimth*** now in November is just passing its peak of flowering development. It provides excellent camel grazing as well as fair firewood, although it is still greenish and generates considerable smoke.

The next day is a long one, again covering nearly 50 km and putting them into the southwestern edge of the tract called ar-Radā'if. After rains, this tract is prime grazing country in the spring, but the dominant ***ʻarfaj*** shrublets (fig. 1.7) are now only bundles of dry sticks. The camels will have to make do with bits of dried annuals left over from the previous season. In the campfire, ***ʻarfaj*** flames up like tinder and is useless as a long-burning fuel, but it is good for starting the dried camel dung that is collectible in many desert places and that will soon be glowing like charcoal. The end of the next day puts the party within sight of the desert village of Qaryat al-ʻUlyā, a settlement of the Muṭayr tribe. ʻAlī decides he will go in to the little market the following day to seek any news of rains. He takes along his ***slūgī*** hunting hound in hopes of starting a hare and carries his single-shot shotgun in hopes of spotting an early bustard ***(ḥbārā).***

The ***slūgī,*** a slim, light-colored dog like a greyhound (fig. CD.25), is part of many Bedouin households. It is swift enough to run down the desert hare *(Lepus capensis).* In Bedouin animal classification, the ***slūgī*** is not considered to be a kind of dog ***(kalb),*** which in Arabia is thought of as a coarse and unclean animal good only for watch duty and is never made a pet or taken into the tent. The ***salūgī,*** treated linguistically as a unique generic, is a hunting companion regarded with some affection by the family and is often found in and around the household precincts. The differences between a ***slūgī*** and a dog is emphasized in the following rhyming line, used among Āl Murrah to make fun of anything improperly mixed or impure:

Lūgī, lūgī, māhū kalb walā slūgī!

Lūgī, lūgī, it's not a dog and not a ***slūgī!***

Eastern Arabia before around 1955 had larger game, including two species of gazelle and, in the Rub' al-Khālī, the Arabian oryx *(Oryx leucoryx).* Hunting done from motor cars with semiautomatic rifles soon drove them to virtual extinction. The ***ḥbārā*** (houbara bustard, *Chlamydotis undulata*) is the prime feathered quarry, often hunted with falcons. It is a migratory species, arriving in Arabia in the fall for the winter season.

Everyone in the market knows of the rains in al-Qar'ah, now only 50 km away, but so far there has been no news of rain elsewhere. The two families reach the edge of the gravel plains late the following day. The next morning, after they pass the ridge of al-Warī'ah and the deep wells of Khubayrā', 'Alī decides to check one of his favorite spots for hunting ***fag',*** the desert truffles. There will be none to find at this time of year, but he can check for soil moisture. If it has rained here, he knows it will be worthwhile looking for ***fag'*** again in the spring; if not, it won't be worth the trouble. He smiles as he digs into the gritty earth. It has indeed rained and pretty hard. He has told the family not to divulge the location to outsiders.

By late afternoon, they find Fayṣal's tent north of the oil pipeline road. The families greet each other in standard Āl Murrah fashion, putting their hands on each other's shoulders and, with faint smiles, gently touching noses three times and asking many times over: "How

> are you? How are the herds?" The new arrivals pitch their tents near Fayṣal's and gather to discuss the water situation. Is the standpipe very crowded?

In the cooling days of autumn, camels can go for several days without watering, but they must drink occasionally, and the families will need their own tent supply. The few hand-dug wells on the northern plains are very deep, and much work will be required to draw enough for the herd. The Āl Murrah group has therefore decided to water at the pipeline motor pump and trough, some three hours' ride to the south of their location. Sālim's family has two kinds of water bags that can be carried on camels. One is the traditional ***girbah,*** a goatskin or sheepskin bag made of a whole hide with the legs and other openings tied shut with thongs. When full of water, the leather sweats continuously, keeping the contents cool by evaporation. The other containers are made of the inner tubes of large truck tires, cut into halves with the ends tied off. The water in these tubes gets hot in the sun, but the tubes are less prone to loss by evaporation or leaks (fig. 4.2).

> Sālim's family experiences an emergency midway into their first week at the new campsite. Miznah, their twelve-year-old daughter, has been bitten by a ***ḥayyah,*** sand viper (fig. CD.43), while walking barefoot behind the tent after dark. Sālim is worried because Miznah is in considerable pain, and such bites, he knows, can become infected and go bad. The next morning Miznah's mother walks about a mile to a shallow runnel where some sparse bushes grow to get some ***ramrām*** leaves, a traditional snakebite remedy to be used as a poultice. She is back an hour later and immediately mashes up the rough-haired, slightly succulent leaves and ties them over Miznah's wound. Miznah says she thinks it feels better then, but Sālim says he will take her on camelback down to the pipeline road, where they can catch a ride to the oil company clinic. As it turns out, Sālim and Miznah do not return for another week because they are sent on to the hospital in Dhahran, where some minor surgery is required.

The common sand viper of eastern Arabia, *Cerastes cerastes,* is responsible for virtually all cases of snakebite in the region. It is the Old World analog of the American sidewinder, which it closely resembles in size and habits. It injects rather small amounts of venom, and its bite is

seldom life threatening except to small children. The only other dangerous snake of the area is the black, hoodless cobra, *Walterinessia aegyptia,* called ***yaym,*** sometimes believed to have the power of flying like a bird. Fortunately, it is extremely rare. By the time the coldest weather arrives in December, snakes are no longer abroad at night and pose little danger.

> Meanwhile, the grazing is not going very well. The camels are nibbling off the thin haze of green as fast as it grows, and Sālim knows that when the really cold winds come in a few weeks, growth of the annual plants will all but cease until early spring. The stock is not losing weight anymore, but neither is it gaining. Finally in December, with the Bedouin season of ***shitā*** beginning, comes some good news. Heavy rains have fallen in the heavy sand belt of the Dahnā', some 185 km to the southwest. Water is hard to come by in that area, but large, long-lasting rain pools, ***khbārī*** (sing. ***khabrā***), have formed in the rocky Ṣummān country bordering the sand on the east. Sālim and Fayṣal talk together and with their wives about this new opportunity. Crossing the rocky Ṣummān to the Dahnā' will be a rough trip in the cold weather. When they get there, they can expect no new plant growth until early spring. But when it does come up, they know, it will be really lush. Better to stake out a good area for their herds now rather than wait for the huge influx of tents sure to come in spring.
>
> The families do not discuss it, but in the back of their minds they are also thinking of the comfortable sand country. The lower dunes of the Dahnā will provide good ***'abal*** firewood for the coldest days yet to come. The camels can winter-graze on dry standing ***sabaṭ*** grass on the stabilized dunes and on the dry ***nuṣī*** grass on the gravelly strips between the linear sand forms. A week later the two families have packed the baggage camels and moved off westward.

Tribes that spend much of their time in the great sand bodies of Arabia, such as Āl Murrah, al-'Awāmir, and al-Manāhīl, always prefer traveling and camping in sand country rather than on rocky or otherwise hard ground. In the more arid regions, the sands generally provide the best grazing vegetation, and they are considered soft, "comfortable," and "clean." Camels raised in sand country, for which their feet are specially adapted (fig. 4.13), may go lame with tender feet if suddenly forced to work on rocky ground. A sand area in the most general sense is called ***ramlah,*** but

a general term for "dune" hardly exists in Bedouin speech, which prefers more specific nomenclature. The barchan (the crescent-shaped dune that marches downwind alone or in groups with a steep, cascading slip face in its mouth) goes by the name ***ṭi's*** (pl. ***ṭi'ūs***). The rounded dome or whale-back without slip face goes by ***ẓbārah*** (pl. ***ẓbāyir***). Linear dune forms are known as ***'irūg*** (sing. ***'irg***), a word that means literally "vein" or "nerve" as well as "root." The "sandstorms" beloved of Hollywood Saharan scenes seldom pose problems to Bedouin camp life in the sands; even quite strong winds in fact lift the grains only a foot or so above the streamlined dune surfaces. But one does avoid pitching a tent immediately in the wind shadow of a dune slip face because even moderate breezes will lead to an irritating rain of fine grit from the upper lip, and the slip face itself can move slowly forward toward the tent. All things considered, our two Āl Murrah families are looking forward with keen anticipation to setting foot again in the sandy comfort of the Dahnā', named for the reddish color of its fine, iron oxide–coated grains.

The group moves off to the west the following midmorning, driving the camels ahead across the smoothed pebbles and cobbles of the Dibdibah. They head back toward the country of the Muṭayr tribe, whose deep wells at al-Liṣāfah, within the eastern edge of the Ṣummān, will provide the last fill of the water skins before the families set off across the dry, limestone plateau. It will be a job raising enough water because the wells are more than 60 m deep. They reach al-Liṣāfah on the third day and are glad to find the wells deserted; they will not have to wait for their turn. They spend the following morning raising water by hitching camels to the long well ropes over pulleys, driving them down along the big mound of dung around the well mouths and out on the straight runways worn by long use, until the leathern buckets finally reach the surface.

After camping for the night at the wells, they are off to the west the next midmorning. Their trip to the edge of the Dahnā' sands will take the most of five days at a fairly easy pace. Their route will parallel the ancient track leading from al-Lihābah to the wells of al-Qā'īyah beyond the Dahnā' in Najd, but keeping north of that trail. Their track is seldom a straight line because they prefer to keep as much as possible to the silt basins that dot the Ṣummān, with their softer and more vegetated

> floors, and to avoid the barren and hard limestone ridges. There is much excitement when, on the afternoon of the fourth day, they sight ahead of them, from the top of a rise, what appears to be a desert lake hundreds of meters across. They have reached the first of the ***khbārī,*** or rain pools, that had been reported in this area. The water is fresh, cool, and clean, and the two families decide immediately to camp for the night near its edge. In the morning, all take advantage of the chance for a fresh wash, the men and boys going to one corner of the pond, the women and girls to another some distance away. They also top off their water skins, although it is slow work skimming these shallows with buckets. Two containers are filled with rainwater only; they will provide the extrasweet water preferred for brewing tea and coffee.

Rain pools can be important water sources in Arabia's northern plains, where wells are few but where rainwater can stand for weeks or even months on rock- or clay-floored natural basins. The water in such pools is usually quite fresh, although its quality diminishes over weeks as it is fouled by drinking livestock and human use for washing. The locations of rain pools are a function of local topography and of course require the presence of a relatively impervious stratum at or near the surface. Despite their existence for only a fraction of the year, many of these pool sites have developed populations of small crustaceans (I have seen at least two genera, including *Triops*) that hatch from drought-resistant eggs in a matter of hours after soaking by rain and that grow rapidly to adult form within a few days or weeks to complete their life cycles.

> It is not long after noon prayer the following day that Miznah's young eyes spy the faint reddish line on the western horizon. "I think I see the sand," she says. The younger children have been asking for hours now, "Are we there yet?" "How much farther?" Sālim turns his camel toward slightly higher ground and unwraps the red cloth around a battered pair of binoculars. "It's ***'irēg ad-dḥūl.*** We should get there by sunset."

The Dahnā' is a curving sand belt that forms a natural boundary between the eastern lands sloping very gradually down to the gulf and the inland plateau called Najd. It looks narrow on the map but has its own internal structure: a parallel series of some seven ***'irūg,*** or linear sand

ridges, each with its own name. What Sālim calls ***'irēg ad-dḥūl*** is the easternmost of these ridges, "little sand ridge of the ***dḥūl.***" The word ***dḥūl*** (sing. ***daḥl***) means "sink holes," which are well-known features of the limestone Ṣummān country on the eastern edge of the Dahnā'. The ***dḥūl*** are narrow openings or natural shafts in the limestone, going down sometimes tens of meters and usually with horizontal passages. Lying as they do in low spots of the rocky surface, they tend to collect rainwater. Bedouins generally use these water sources only in special need because the usual well bucket and rope cannot be inserted into these contorted shafts from the surface. Using them involves a dangerous climb down with a bucket into the dark interior of the sink and sometimes crawling for 100 m or more along pitch-black horizontal passages to reach the end pool.

> The families put up only a tarp for the night when they camp just inside the edge of the sand. 'Alī, kneeling in the sand, has already dug a test hole to check the local rainfall and has found it very satisfactory. In the morning, Sālim and 'Alī move off alone on camels to scout the surrounding country. They are back by noon, having found a good spot behind the second ridge for their first camping place. When they get there, the women smile to see the hefty bases of large ***'abal*** bushes that will make good firewood. They will be needing a great deal of fuel in the coming weeks, which might at times bring frost.

Bedouins, especially those belonging to tribes from the south, such as Āl Murrah, say they suffer more from the cold of winter than from the heat of summer. Farther north, on the high plateau lands ranged by northern tribes such as the Ruwalah and Shammar, even sleet and brief snowfall are not unknown. Winter dress usually includes the ***farwah,*** a heavy sheepskin coat with the fleece turned inward, and the boots known as ***zarbūl*** (pl. ***zarābīl***), made by craftsmen in the oases such as al-Ḥasā. These boots have leather soles and partial uppers, with coarsely woven camel hair tops about 20 cm high. A family, however, seldom has enough of this winter gear for all its members, and some may have to go barefoot and to wear only thin cloaks through the cold season.

> The two-family encampment gets down to a quiet routine for the following cold weeks, with the camels grazing on the dry tops of grasses poking out of the sands and running along the edges of the interdune

flats. The only excitement comes in mid-January, when a convoy of oil company vehicles works its way along the eastern edge of the sands, stopping from time to time to send up showers of earth with explosives placed in drill holes. Miznah asks her father what that was, and Sālim replies that when Americans are looking for oil, they put bombs of ***dēnamīt*** in holes and blow them up. This explosion makes the oil deep down in the ground shake, and when it shakes, they can see it with a special kind of ***darbīl*** (binoculars). His explanation would not make the grade in Geophysics 101, but it serves his purpose well enough. When the trucks leave, he walks over to the seismic line with the children. They marvel at the size of one pair of footprints. Workmen had put pipes with welded numbers at long intervals along the line, and between them are little wooden stakes with red flags. The word has gone out from the province's emir that no one is to touch those markers, but the family group picks up lengths of insulated electrical wire abandoned by the shot crew. It is useful for mending broken saddle frames and sewing leather goods. There are also some nice tin cans with tight lids, good for storing sugar and tea.

After supper, both families gather around a fire at one tent. A pile of ***'abal*** firewood helps to break the cold ***shamāl*** wind. The grown-ups drink coffee, and everyone else has hot tea with milk. Miznah's little brother begs his father to tell the story about how Sa'd (Orion) fought al-Gamar (the moon, which is of masculine gender both grammatically and conceptually in Bedouin Arabic) over who would get to marry ath-Thrayyā (the Pleiades). He had heard the story the first time last year, and he never tires of it, especially the part about how Orion had his head cut off and how the moon got a black eye in the fight. If the moon is up and anywhere near full at story time, he will run outside the tent and look for the black eye on the moon, which is still there for anyone to see. His older brother prefers stories about Ghēhabān, a hero among Āl Murrah who rose from obscurity to lead his tribe. One of the stories ends with a poem that the children don't fully understand. Sālim explains the meaning of the words.

Once, when the weather is still cold, the wind changes and comes from the southeast, and clouds begin to build up in a warm spell. It rains for half a day, not very hard, but a nice slow soaker. Then it gets cold again.

The campfire stories mentioned here are only brief examples of the rich oral literature that have always been a feature of Bedouin culture. I was told the story of the battle between Orion and the moon by a Marrī consultant. There are doubtless many other such star tales yet to be recorded. Bruce Ingham transcribed and translated two Ghēhabān tales as examples of Marrī speech (1997, 101–10). (See the accompanying CD for sound clip of a Bedouin song.)

> The sands don't begin to change until almost the end of February, when the days begin to warm a bit. But then things happen fast, almost like magic. Patches of lawnlike greenery sprout along the lower banks of their sand ridge as the annual plants push upward. Many patches seem to be all the same thing: ***yanam,*** the *Plantago* whose narrow leaves are already showing their covering of fine downy hairs. Other areas have different plants mixed in, which are not yet recognizable to the average school botanist but which ʿAlī can name immediately: ***ghrērā, ṣmēmā, ṣiffār, tarbah, gaḥwīyān,*** and ***ḥurbuth.*** The camels nibble off these seedlings as fast as they appear immediately around the tent and out along their usual daily grazing places, but ʿAlī knows there will be plenty within a few hours' walking time throughout the spring. By mid-March, most of the annuals are in flower, and the sweet perfume of the ***khẓāmā*** blossoms, which now seem to be inexhaustible, is scenting the milk. Some of the flowering plants bear bright crimson, spiderlike creatures, ***umm al-maṭar*** (mother of the rain), the giant velvet mites that seem to hatch only in times of plenty. The two families cannot use all the milk, even after the twenty-five newborn camel calves have all they need, so the women and older girls work together to make ***igṭ,*** the dried sour cheese cakes (fig. 4.3) that can be kept and nibbled throughout the coming year. Miznah takes her little brothers out to collect salad plants: the sour but refreshing reddish leaves of the wild dock, ***ḥambaṣīṣ,*** and the peppery leaves of a yellow-flowered crucifer, ***ṣiffār,*** which they bring back in handfuls to the tent (as in fig. 3.3).
>
> Indeed, everything seems to be going well. The nights are no longer so cold, the days are balmy, and the rising voice of ***umm sālim,*** the lark, can be heard in his spiraling spring courtship display. Other Bedouin groups have moved in to the greenery of the sands now, many

FIGURE 3.3. Sister and brother of the Ghayāthīn Āl Murrah return to the tent with handfuls of the cruciferous annual ***ṣiffār*** *(Schimpera arabica)* to be eaten as salad greens. Near al-Warī'ah, 10 February 1961.

Muṭayr, even some ***shawāyā,*** sheep-herding groups, from southern Iraq with donkeys instead of camels. They keep their distance from the Āl Murrah early birds, however, and there is no bickering beyond a bit of campfire muttering. The two families move their camping place twice as the spring season progresses, each time to areas with less grazing pressure and farther from other tents. Another rain falls in mid-March as a squall line moves over the Dahnā'. It lasts only half an hour, but it comes down in buckets with lightning and thunder nearby. Some of the rain pools out on the limestone are replenished, even doubling in size, but others, outside of the rain spots, get nothing and continue to shrink. The Bedouin families make periodic trips out to the pools, mainly to bring in water for making tea and coffee. The camels need no water at all while grazing on the now-lush annuals, and the families are drinking mainly milk, not water.

'Alī has not forgotten his truffle ground back in the Dibdibah. If he waits until the families' return trip at the end of spring, the ***fag'*** will be tough and dried out, and somebody else might find the spot. He better make a quick trip over there now. He is off before dawn one morning with two of the older boys, all on their best riding camels. This will be a good lesson for the lads, he thinks—this fast travel without the whole household coming along.

They reach the spot at sunset after two long days and part of one night in the saddle, covering 150 km. No one else seems to have been there, and in the morning they walk slowly through the spring growth of ***ragrūg*** and ***umm as-swēgah,*** knowing that the truffles will be found only where those plants grow. They look for the telltale cracks in the slowly drying earth, often with little humps that mark the hiding places of the swelling fungus (figs. 4.7, CD.339). They find some ***fag'*** almost immediately and are happy to discover they are in good time; the ***fag'*** haven't yet hardened or dried out. They work all morning in the hunt, and by the time they find no more, they have two saddle bags full of the earthy-smelling truffles, many of them of the large ***zbēdī*** variety as big as their fists. Both households are outside to greet them when they finally get back to the tents, exhausted but proud of their trophies. They pour out the truffles on a tent mat amid "oohs" and "aahs," and several handfuls are selected immediately for fireplace roasting that evening.

Such are the delights of the Bedouin ***rabī'*,** that rare, brief outpouring of desert productivity that usually happens only at intervals of several years when the rains are not only plentiful but come with good timing. As often as not, there may be only one rainfall in a given area, which may not be great enough for the germination of annual plants. Or the ***'ishb*,** annuals, may spring up from one rain but then go thirsty. Then, as in the advertising understatement, "some restrictions may apply." As the still-tiny plants sense a continued lack of water, they may struggle into bloom when only a centimeter or so high, with hardly any leaf, and from these depauperate flowers produce a few seeds for the next year, when conditions might (or might not) be better. When chance brings repeated rains at intervals of several weeks, however, the annuals can reach full development, blooming with profuse greenery in luxuriant meadows that nourish all animal life in the desert as well as Bedouin livestock.

> By late April, however, the annuals have finished flowering and are beginning to dry up. By early May, the days are becoming hot, and the camels have to be taken again out to the rain pools, many of which are now reduced to cracking mud spots. Miznah's nine-year-old brother Ḥamad has been watching the ***ḍubbān*,** the big, spiny-tailed lizards (fig. CD.42) that have their burrows down on the flats between the sand ridges. Now that the days are warmer, they tend to be less skittish, lying out in the sun farther from their holes around midday, becoming bright yellow in color. Ḥamad has found that he can carefully creep up on them almost to within catching range, and one morning he comes back to the tent triumphantly carrying a fat-bodied ***ḍabb*** almost half a meter long. He knows it is good to eat and asks his father if he, because he "hunted" it, can slaughter it himself and have the meat for supper. Sālim smiles and says yes, but that Ḥamad should share it with his brothers and sisters. Later, before supper time, Ḥamad takes the ***ḍabb*** off to one side of the tent. He gravely recites the blessing formula, ***"bismallah ar-raḥmān ar-raḥīm"*** (in the name of God the Compassionate, the Merciful), just as he had seen his father do while killing the lamb for their 'Īd feast a few months ago, and then quickly dispatches his quarry in the correct fashion, using a small knife. Curious about the distended stomach he finds inside, he cuts it open to see what is within. He is amazed at all the ***'ishb*** that is still recognizable. "Look, ***bābā*,** see

> all the plants: ***khzāmā, ḥurbuth, sa'dān,*** and ***yanam.***" Sālim explains that is why the ***ḍabb*** is good to eat—because it eats only plants, just as a sheep or a camel does, whereas the ***waral*** (the desert monitor lizard—the other large lizard of these habitats) is not edible because it eats animals, including poisonous snakes.

In 1964, I took six specimens of ***ḍabb*** (*Uromastyx aegyptius microlepis* Blanford) and identified eight species of plants from stomach contents (Mandaville 1965b). I roasted the tails and hind legs of two specimens and found the flesh tasty if somewhat fibrous and stringy. There was no "gamy flavor," and the meat seemed more like lamb than the chicken or fish to which it has been compared.

> Toward the end of May, all the annual plants have turned to brown. Our now-happy families, having seen the Pleiades setting at evening prayers, know it is time to begin the move back to their summer home, the sandy downs of ***nimrat ithnēn.*** They will move slowly, having with them now a group of mother camels with calves that might have trouble keeping up with the herd, and they will use a route heading back in the general direction of Qaryat al-'Ulyā, which lies in the midst of excellent ***'arfaj*** grazing.

The female camel generally calves only every two years, so about half of a herd of females will drop young in any given year. The gestation period is roughly twelve months. The young are generally weaned within twelve months or less. R. T. Wilson provides useful data on conception and reproductive rates (1984, 97–99).

Although annual grazing plants are generally dead and gone by the end of May, some of the perennials continue to thrive, with flowers and green forage, well into June. The yellow-flowered composite shrublet ***'arfaj*** *(Rhanterium epapposum),* is one of these later bloomers. Several important grazing grasses, including ***nuṣī*** *(Stipagrostis plumosa),* also fall into this group.

> The party moves off slowly the following midmorning, stopping to top off their water bags with the rather muddy remnants of the last rain pool on the rocky Ṣummān beyond the edge of the sands. 'Alī takes the lead on a course a bit north of due east, with all looking forward to the rich ***'arfaj*** grazing that they will reach in about six days.

> On the way, they hope to water again at the deep wells of al-Lihābah before the Muṭayr tribe is settled in there for the coming summer, filling the broad hollow with hundreds of tents and causing delays at the well mouths. In this goal, they are successful, and they soon find themselves crossing alternating stretches of ***ʻarfaj*** shrublets and ***rimth*** saltbush. The camels are choosing to spend more time on the ***rimth*** after their long winter and spring salt fast, although that bush is just beginning to revive from its winter dormancy. They enjoy even richer saltbush fare three days later as they move across the upper part of Wādī al-Miyāh and its scattered saline flats. A strong ***shamāl*** wind comes up out of the north–northwest, and increasing dust in the air reduces visibility. This is not unexpected; it happens every year.

The strong northerly winds of early summer are a usual feature of eastern Arabia as a regional low pressure establishes itself over central Asia with counterclockwise circulation over the gulf and its Arabian hinterland. These ***shamāl***s can blow for days or weeks on end (traditionally they are a forty-day event), leading to dusty skies and gritty conditions for both the Bedouins and townsfolk. Uncomfortable as these windy conditions may be, they are considered preferable to the doldrum days that follow in mid- and late summer, when winds fail completely or are replaced by southeasterly breezes off the southern gulf. Oppressive humidity then creeps in and hangs over the gulf coast for its infamous later summer period, which, particularly for those without modern air conditioning, is a strength-sapping and debilitating time. Our families' camping place at ***nimrat ithnēn*** is far enough inland to escape the worst of the late summer humidity, but it can still be very uncomfortable there from August to October.

> From Wādī al-Miyāh, the group moves on to the southeast, the wind at their backs, into the tract known as ar-Radā'if, with its low, rounded hills amid dense stands of ***ʻarfaj*** still blooming in yellow. Ar-Radā'if is crowded with other tents. The excellent grazing is sufficient for all, however, although good firewood is in short supply. ʻAlī cautions the children to be careful because desert animal life is now at its peak, and the sand viper and the scorpion are again abroad at night as well as in the early and late daytime hours. The two families continue to move their light camps every day, but only short distances, taking a full week to work their way through ar-Radā'if. On the eighth day, they

> smile to find before them a wide sandy tract where ***'arfaj*** has been supplanted by extensive stands of shrubby ***thmām*** grass and scattered ***'abal*** bushes, now with their hanging, fringed, red or yellow fruits (fig. CD.101), like Christmas tree decorations (of which our travelers have never heard). This area marks the northern edge of al-Ḥabl, the familiar summer grazing ground adjoining their summer campsite at ***nimrat ithnēn.*** Three days later they are busy putting up their main tents again, with backs to the continuing wind, within easy reach of the now familiar camel trough. This location is not their tent site of the previous year, but another spot nearby where the sand is fresh and clean and where a slight elevation gives a good view of the nearby countryside. Everyone has a good wash with the plentiful, naturally warm, deep well water. Except for the camel mothers with new calves, the herd will soon be given new freedom.

It is not unusual in Bedouin practice, particularly with a herd that knows a certain area as "home," for the camels to be left largely unsupervised during the summer encampment. They wander the countryside on their own, never straying to great distance from the home well, coming in by themselves every two days or so for watering. The end of summer may thus require something of a "fall roundup," bringing the herd back together and under control, preparatory to the supervised move out again for the next season's winter and spring rounds of grazing.

> One of the first things Miznah's mother does after the tent is set up is to visit her own mother and father, who are only about half a kilometer away. Her father and her husband's father are brothers. When she returns before evening, she is carrying a heavy bundle. It is her hand loom, which she had left there for safekeeping. On it, now rolled for easier carrying, is a half-finished strip of work that will become part of a new tent divider. She has told Miznah that Miznah can start her own ***sāḥah,*** rug, this summer, and she has brought along a smaller loom for that project, which will involve a great deal of mother–daughter instruction. Such projects will help fill the long summer hours until things become busier again with next season's move in the fall.

First-cousin marriages are common in Arabia; in fact, they are formally considered the norm. In practice, it is far from an iron-clad rule,

although frequent Bedouin marriages within the clan help maintain tribal solidarity. It also means that near relatives will often travel together, which enhances family contacts and ties in the summer encampment. The hand loom used by this family is of the usual Bedouin horizontal type, with the warp stretched between wooden poles staked at each end in the sand in front of the family part of the tent, often with the working end under the tent roof edge to provide shade for the weaver. The product is a truly woven piece, not the knotted type of carpeting produced by some tribes in Iran. It can be a ***sāḥah,*** a ruglike ground mat, or several strips that are joined together to form a tent divider. Narrower strips are produced to reinforce and decorate parts of the tent. A typical ***sāḥah*** is some 250 cm long by 120 cm wide, made of two 60-cm-wide strips sewn together lengthwise. The pattern, almost invariably geometric and of traditional designs passed down in the families, often involves three or four colors, such as black, brown, white or off-white, and red (figs. CD.31, CD.291). A skilled weaver produces work of almost machinelike neatness, giving careful attention to the tightness of the weft and traditionally using the hooked tip of a gazelle horn to pull up the threads when required. I was told that vegetable dyes were once used for yarns, but the samples I saw were chemically colored with market-bought imported dyes.

> All family members look forward to the more frequent summer visits to the oasis town of al-Hufūf, with its colonnaded and shaded market stalls. Sālim and ʻAlī often encounter old friends there, and Miznah's mother hopes to get spousal approval to spend a few days at the open-air women's market at the south end of the covered area, where she can sell some of this season's ***igṭ*** production and some excess balls of black wool yarn that she and the girls have spun over the past few months. The money can be used for trinkets. This market is also her favorite place to buy the few herbal remedies she keeps in her personal chest in the tent. The sellers, she knows, are not "real doctors," but they always seem to understand the symptoms she describes. ʻAlī plans to visit the al-Hufūf camel market to sell some of the remaining young male camels of the previous season, now more than a year old. Miznah's little brother, during his first visit to the oasis, marvels at the thick forests of date palms, which look cool but a bit spooky compared to the open desert where he is growing up.

We leave our Bedouin friends here, with the herds still in near-peak condition and the camels grown in number—the best possible beginning for the coming hard times of mid- and late summer, when forage around ***nimrat ithnēn*** will diminish to slim pickings. The livestock will again lose weight. The hot weather will bring discomforts but also welcome social occasions as fellow clan members visit tents pitched close together. All know that nearly three months will have to pass before they can again look to the south for the rise of ***sihēl*** and the making of plans for another round of fresh grazing.

Plants for Use

4.1 Plants for Livestock Grazing and Browse

FOR THE BEDOUINS OF Arabia, the use of wild plants as livestock forage, defining as it does their very subsistence mode and ruling virtually all aspects of their annual cycle of movements and activities, dominates their interest in desert plant life. During my data gathering, I did not follow grazing field activities per se at length or in great detail but had occasions for field observations of many aspects of grazing practice. These observations, in general, confirmed other observers' descriptions (Musil 1928a; Cole 1975; Lancaster and Lancaster 1999).

My consultants classified their livestock as indicated in the Venn diagram in figure 4.1. Bedouins that I worked with represented primarily camel-herding groups. A few of them kept some sheep and goats when camped for longer periods near Dhahran for part-time employment, and relatives in the hinterland cared for their camels. The favored breed of sheep in eastern Saudi Arabia is the all-black, fat-tailed ***'arabīyah*** (pl. ***'urb***), which is said to provide the best wool for tents and cloaks as well as milk for household use. It has a reputation for requiring less attention because it tends to wander less than other breeds. More common in commerce as a meat animal, even in the east, is the ***najdīyah*** (pl. ***najad***) sheep, black with white face, with less fat in the tail and with thinner wool (fig. CD.40). Another breed, the light-colored ***'ūsīyah*** (pl. ***'awasā***) of southern Iraq, is seldom seen except in the far northern reaches near the Iraq border. Goats are of a long-eared variety with the straight black hair favored for use in the weaving of tent material as well as for wool. Such small household flocks of sheep and goats that I saw around the tents of some of my consultants were cared for largely by the children of the family under the direction of the mistress of the household. The area of their grazing was generally around the main camp area and seldom beyond sight range of the tent. Camels (dromedaries; the single-humped species), however, were by far the most important Bedouin grazing animal among my consultant groups.

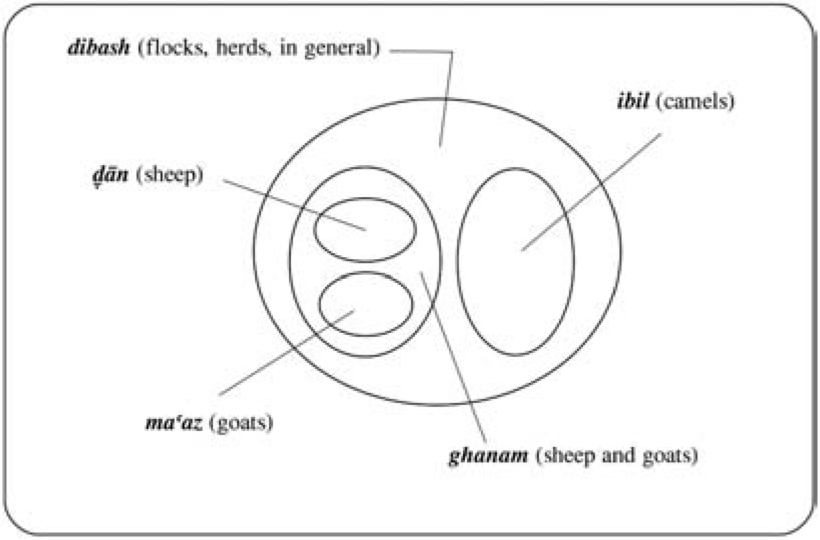

FIGURE 4.1. Bedouin classification of livestock. All of the terms shown here are collectives without singular forms (like the word *cattle* in English). Words based on quite different roots (not shown) are used for the feminine and masculine individuals of each.

4.1.1 The Camel

Aloys Sprenger called the Bedouin "a parasite of the camel" (1891, 361), although a biologist today would no doubt prefer to describe the relationship as one of mutualism or symbiosis. Given the significance of the camel in the Bedouin economy and in many aspects of everyday life, one is tempted to postulate a Bedouin "camel complex" parallel to the African cattle complex described by Melville Herskovits (1926). Herskovits himself suggested that the camel among some African groups outside the cattle regions carried some of the cultural attributes of the cow in his complex area (1926, 644–49). I found numerous ceramic camel figurines among surface artifacts at the Hellenistic–Sassanian period archaeological site at Thāj in the Eastern Province of Saudi Arabia (Mandaville 1963, 13). Alois Musil described circumcision customs among the Ruwalah that involved the slaughter of a camel (1928a, 245). Camels, among other livestock, are today slaughtered annually on the occasion of ʻĪd al-Aḍḥā' as part of

the annual Muslim pilgrimage ceremonies. A consultant of the Āl Rāshid tribe told me that among his group of the southern Rub‘ al-Khālī a camel is slaughtered at a funeral feast by the relatives of the deceased and that a male camel calf is often killed for a feast at the birth of a boy.

Camel breeds and varieties in Arabia vary as much as horse breeds do in Western countries, ranging from coarse baggage types to high milk-yielding breeds and the fine-featured, thoroughbred riding animals called ‘Umānīyāt because they originated largely in the region of Oman or its hinterland in southeastern Arabia. The most common type in the herds of my consultant groups was the all-black or dark brown ***mijhim*** (pl. ***majāhīm***). The name is basically a color term meaning "black" or "dark," but it also identifies a recognized breed well known for its high milk production. Every tribesman knows the names of individual famous camels, and a number of tribal groups or families maintain special herds known by name throughout the country. The Muṭayr tribe of our north-central area kept a famous herd of black camels known as ***ash-shurf,*** or "the noble ones," until they were confiscated by King Ibn Sa‘ūd as a penalty for their rebellion against the royal family. The brother of one of my Āl Murrah consultants had in the early 1960s been appointed keeper of the renowned herd of thoroughbred riding and racing camels belonging to the governor of the Eastern Province, a member of the royal family. This prize collection of animals, called ***al-mingīyah,*** "the select or chosen ones," was the cream of the governor's large herds and carried, in addition to his family brand, a special brand made up of two circles on the side of their necks. The possession of camels remains a mark of high prestige, and wealthier individuals often keep herds of hundreds, far beyond subsistence requirements.

Camels are usually slaughtered only on special occasions, and those slaughtered are almost invariably young male animals. There is also some slaughter or selling of male calves to save milk for household use and to maintain the high female-to-male ratio favored for Bedouin herds. At the time of my earlier data collection in the 1960s, camels were still being used for transport, both to carry goods and for tribal household movements (fig. 4.2). Such use has since then been almost entirely displaced by motor vehicles. Members of the merchant gild known as ***al-‘igēl,*** from northern and central Arabia, formerly carried out a large export trade in camels, to Syria and Egypt. According to an elder Shammarī consultant, the purchased herds were taken through Damascus or Palestine for resale

FIGURE 4.2. Bedouin loads a camel with two truck inner tubes used as water carriers (1961).

in Egypt. By the time of the Arab–Israeli War in 1948, the markets were closed off, and by about 1955 the kingdom had become a net importer of camels. Before the Saudi regime suppressed intertribal conflicts in the 1930s, thoroughbred riding camels were an essential tool in long-distance raiding. There is still interest in high-bred animals for the sport of camel racing, which continues to be popular in Saudi Arabia and other Arab states of the Persian Gulf region.

In the main, however, it is for milk that the Bedouins keep camels, and camel milk has always been the traditional staple of their nutrition. The milk is used either fresh, when it is termed ***ḥalīb,*** or soured for longer

keeping in the form called ***laban.*** The latter is made by pouring the fresh milk into a sheepskin or goatskin bag kept for the purpose and that maintains the inoculant required for controlled souring. Some plants on which camels graze tend to scent or flavor their milk. I found that the highly fragrant cruciferous annual ***khzāmā*** (*Horwoodia dicksoniae,* figs. CD.210–12) lent a discernible perfume to the milk of camels grazing on it among spring annuals. The dune land perennial ***ʻādhir*** *(Artemisia monosperma)* is said also to lend a slight aromatic quality to milk. The milk of camels grazing on saltbushes tends to develop a slight salty flavor reminiscent of the smell of crushed chenopods. A Hājirī consultant advised that camels are fond of the thistle ***marār,*** *Centaurea pseudosinaica* (fig. CD.115), but that this plant taints the milk with bitterness (the plant's vernacular name, ***marār,*** is derived from the word for "bitter," ***murr***). According to a Marrī Bedouin, a plant called ***khimkhim*** gives the strongest scent, "not very good," to camels' breath and milk. I was not at the time able to identify the species botanically with certainty, but there are good reasons to think it is the crucifer *Matthiola longipetala* (figs. CD.234, CD.235) and the very similar *M. arabica* (see the ***shgārā*** entry in the list of generics in chapter 6).

Beyond simple souring and the churning of butter (the latter usually from sheep milk), the only milk-processing method used is the preparation of ***igṭ,*** a form of dry cheese made by boiling soured milk curds until the contained water is almost entirely evaporated, and the curds thicken into a heavy paste. The cheese is then formed by hand into flat-bottomed cakes 8–10 cm in diameter and about 1.5 cm thick, each bearing across the top three parallel grooves made by the pressure of the maker's fingers (fig. 4.3). These cakes are dried in the sun, sometimes by laying them out on top of the tent roof, until they harden. They will then keep up to a year and can be nibbled as they are or crushed up with water to form a sort of reconstituted milk. Musil reported that the Ruwalah Bedouins of northern Arabia used camel milk for this purpose (1928a, 89), but my impression of practice in the east was that sheep or goat milk was the usual raw material. Klaus Ferdinand describes the process in some detail as carried out by an-Nuʻaym Bedouins of Qatar (1993, 94–101). When made from sheep or goat milk, ***igṭ*** is prepared from the curds of buttermilk after the butter has been churned and removed. It is thus a low-fat, high-protein food. A Banī Hājir consultant gave me specialized terms for different forms of this product: ***al-hishāmī*** for the whole cakes when softish in texture, ***al-jlūf***

FIGURE 4.3. ***Igṭ,*** dried white cheese cakes made from soured milk curds. Each of the five here is about 7 cm in diameter. Note the maker's full-length finger imprints across the tops.

for cakes when rock hard, and ***al-frūg*** for the small, hardish pieces the size of coffee beans. As noted later in this section, consultants pointed out that wild plant parts are sometimes added to the milk product in the preparation of ***igṭ,*** possibly to enhance coagulation and separation of the curds.

Camel milk is low in separable fat, but a form of butter called ***jbāb,*** generally considered inferior to butter from sheep or goat milk, is sometimes made from it. A greasy oil called ***widak*** can be rendered from the camel's hump on the rare occasions that the animals are slaughtered. It can be used in food or for application to leather as a softener and preservative.

Other camel products include the hair (generally called ***wabar,*** "fur") and leather from the hides. Camel hair, along with goat hair and wool, is used in making ***siyāḥ*** (sing. ***sāḥah***), the decorative woven rugs made by the women, and for the woven divider curtains ***(arwigah)*** of the tent. Camel hair is considered to be too weak for making the roof and main side curtains of the tent, so goat hair, sometimes mixed with wool, is used

for those parts. Camel leather, now generally made by craftsmen in the towns from purchased hides, is used to make the large bags called ***'iyāb*** (sing. ***'aybah***) for carrying family property when on the move. It is also used in making the portable troughs (***ḥīḍān,*** sing. ***ḥōḍ***) used in watering livestock, the leather bucket (***dalū,*** pl. ***dalī***) used in drawing water from wells, and a kind of skin bag for water called ***mzādah*** (pl. ***mzād***), larger than the more common type made from goat skins.

Camel dung, ***jallah,*** is collected when dry and used for cooking fuel when the family is camping in country with little perennial vegetation or in areas where shrublets have weak, fast-burning stems that do not form good coals (fig. 4.4). Dried ***jallah*** is also pounded up into a powder and used to make diaper packs for babies (Dickson 1951, 179). Camel urine (that from the females is always preferred) may be caught in bowls and used as a hair wash said to make the hair shiny and rid the scalp of vermin. I once saw one of my consultants run up behind one of his female camels and catch a double handful of fresh urine which he used as an immediate mouthwash, saying it was good "to make the mouth clean." Camel urine was also used to bathe newborn infants (Musil 1928a, 243). In dire emergency, when a Bedouin finds himself with empty water bags and in danger of dying of thirst, he may sacrifice a camel and drink the semiliquid contents of its rumen after filtering them through cloth. A consultant of the Qaḥṭān tribe told me that it is also possible to induce a camel to vomit the contents of its rumen and thus obtain liquid without killing the animal.

The camel's physiology is remarkable in several ways. Its power to go long periods without drinking is due not to any special ability to store excess water in the body, but rather to an economy in its use. The camel sweats less than other ruminants and thus expends less water for cooling. It can do this by virtue of its tolerance for high body temperature. Knut Schmidt-Nielsen (1964) found that the camel's body temperature goes through wide diurnal swings, rising as high as 40.7°C during the day and falling to 34–35°C during the night as the previous day's heat load is shed to the cooler environment. The camel can also tolerate great water loss, to at least 27 percent of its body weight, whereas a 12 to 14 percent loss is fatal for most other mammals (Schmidt-Nielsen 1964). The camel's kidney can produce urine considerably more concentrated than sea water (Schmidt-Nielsen 1964), and it thus can drink water of high salinity. I have notes of camels in the Rub' al-Khālī drinking readily from an oil

FIGURE 4.4. Consultant ’Alī ibn Ḥamad of the Ghayāthīn Āl Murrah makes coffee using dried camel dung for fuel. The thin-stemmed perennials at this site, in the background, provide little more than fine kindling. He grinds the roasted coffee beans with a brass mortar and pestle.

company–drilled water well with a measured total dissolved solids of 10,900 mg/l. I have also seen camels drinking seawater on the Persian Gulf coast near Dammam, where the salinity (per Basson et al. 1977) was at least 38 and probably greater than 40 per mille (40,000 mg/l). This faculty is extremely valuable to the Bedouins, who can drink their camels’ milk even when traveling in country where the wells are far too saline for human use. The lactating camel thus becomes the equivalent of a walking

and self-fueling deionization apparatus. Camel milk may also be mixed with well water of salinity greater than human tolerance to make a mixture called ***shanīn,*** in which the salts are diluted to a drinkable level.

The camel's drinking volume requirement ranges between wide extremes. In the hottest season of the year, she must be watered at least every two to four days (fig. 4.5). However, when good spring rains have come and the desert is covered with lush annual vegetation, she can go entirely without drinking for weeks or even two months, deriving all her water needs from the fresh herbage. This latter situation is called the ***"jazū,"*** and camels going thus without free water are said to be ***"majziyah."*** Under such conditions, the camels' grazing ranges are greatly extended, often into areas entirely without sources of free water.

There appears to be no evidence that camels' nutritional requirements are much different from those of other ruminants, with the exception of one important mineral: camels require between six and eight times the amount of common salt considered adequate for other livestock (Wilson 1984, 109). The camel veterinarian A. S. Leese (ca. 1927) recommended a salt supplement of 1.5 to 2.0 oz apoth. (45 to 60 g) per day for camels not on saltbush grazing, but R. T. Wilson (1984) quotes evidence that the actual need from all sources is in the range of 120 to 140 g per day. My Bedouin consultants were all well aware of their camels' physiological requirement for salt, and some of their grazing practices were aimed specifically at meeting it. A Rāshidī consultant told me that if camels in the Rubʿ al-Khālī go as much as a full year without saltbush grazing, they become afflicted with a condition called ***ḥalas*** or ***ḥiṣṣah.*** They become weak and thin and have a tendency to eat bones and carrion. Inasmuch as bone material is not rich in salt, perhaps a lack of other minerals such as calcium, phosphorus, and other trace elements is what leads to this behavior (Gauthier-Pilters 1961, 213), and the acquisition of these minerals, too, may be an advantage of saltbush grazing. Lack of salt in camels is also associated with the development of contagious necrosis of the skin (a bacterial disease) and arthritis. On the basis of experimental treatments in British Somaliland, veterinarian E. F. Peck (1939) recommended a normal daily salt ration of 5 oz (150 g) to prevent both of these conditions. I was told that Bedouins may occasionally dig salt for their camels from natural salt flats (***sbākh,*** sing. ***sbakhah***), which are not uncommon in some parts of the study area, particularly near the coast. This practice is

FIGURE 4.5. Camels watering at a drilled well along the Trans-Arabian Pipeline, northern Saudi Arabia.

infrequent, however, and camels much more commonly obtain their salt requirements from two sources: grazing on saltbushes (I use the term *salt-bush* for all shrubs and subshrubs of the family Chenopodiaceae) and the consumption of saline well water. Good stands of saltbush grazing can be found in most parts of the study area, with some genera such as *Haloxylon* leading well-defined communities that extend over thousands of square kilometers. Herdsmen are careful to take their camels to such areas for several months of the year. An appreciation of the camel's requirement for salt and the grazing practices to meet it are essential, as I explain in chapter 5, to an understanding of the Bedouins' classification of plants above the folk-generic level.

Some fifteen to twenty camels are required to meet basic family needs (Lancaster and Lancaster 1999, 235); William Lancaster and Fidelity Lancaster point out that such a figure can be only theoretical because few if any pastoral societies live in a purely subsistence economy, but most Bedouin households have larger herds. Donald Cole's reckoning of an average herd size of forty to seventy-five adult females among his Āl Murrah group (1975, 36) jibes well with my own observations, although his estimate of twenty to twenty-five for the male riding and baggage camels appears somewhat high. It is my impression that male camels are used for transport not because of any greater strength they might have but rather to spare the more valuable females from work; it would in any case be inconvenient to use females with young for baggage work. The number of male baggage camels kept has no doubt decreased with the increased use of motor vehicles for transport (fig. 4.6). Female camels, in particular those with young, are usually managed in groups separate from the males to see to their special needs or to avoid undesired interaction.

Grazing Practice. The herd owner makes the choice of what general grazing area is to be exploited—that is, where the camping unit is placed geographically—on the basis of his herd's current nutritional needs and after careful intelligence gathering as to the state of the vegetation and rainfall in various parts of the country. Such information is obtained from kinsmen and travelers as part of the intense daily social interaction always taking place in the tents and sometimes from reports of scouts sent out by clan groups specifically to assess range conditions. Grazing in general is called ***ri'ī,*** and the active participle ***rā'ī*** is a common noun

FIGURE 4.6. Consultant ʻAlī ibn Ḥamad of the Ghayāthīn Āl Murrah loads a ***kitab,*** or women's camel litter, onto our oil company truck. An American friend and I had volunteered to move his household to the northern plains for winter grazing. The ***kitab*** is a kind of camel saddle with light overhead framing that can be covered with cloth to provide sun protection and privacy for women traveling by camel. Their ***kitab,*** ʻAlī said, was seldom used now (1961) but was still a prized possession to his wife.

meaning basically "herdsman" but often used in an extended sense for anyone "in charge of" or "taking care of" something. (Someone who makes a business of repairing punctured automobile tires in a small village will thus be referred to as ***rāʻī al-banshar,*** from the English word *puncture*.) My consultants also used the verb ***falā*** (third-person sing. perf.) for "to graze," from which is derived ***maflā*** (pl. ***mafālī***), a noun of place meaning "grazing ground." An intransitive form of this root, ***istaflā***

(third-person sing. perf.), means "to graze" (livestock), and another form, ***mafāliyah*** *(*fem.), is an active participle that means "grazing."

The grazing day begins soon after sunrise as the camels couched near the tents are untied, roused and, if necessary, formed into separate grazing groups. The herdsman drives out (***yisraḥ*** or ***yisarraḥ,*** third-person sing. imperf., "to take to graze") the camels, often riding one of them behind the group and singing a herding song to encourage them on. He dismounts in the middle of the chosen area and watches the herd. Grazing may continue throughout the daylight hours in cool weather but is usually interrupted spontaneously by a rest period during the hotter middle of the day when the weather is warm or hot. During this time, the animals adopt a couched position with (as described in Gauthier-Pilters 1961) their heads always facing the sun, a posture that Schmidt-Nielsen (1964) explains as a means of minimizing areal exposure to the sun and the consequent heat load. In this position, taken for a shorter or longer period depending on seasonal temperatures, the animals chew their cuds. They resume their grazing afterward until near sunset, when the herdsman drives them back to the tents. The lactating cows' udders are often covered during grazing with a loosely woven or knotted yarn mat, with ties at each corner, called a ***shmālah.*** This "brassiere" temporarily prevents the calves from nursing and conserves milk for household use. After being taken back to the tents in the evening, these udder covers are removed, and the females are milked, usually by the menfolk. The calves (***ḥīrān,*** sing. ***ḥwār***) also have a turn. The animals are then bedded down, usually quite near the tents and with their forelegs tied in folded position to prevent the calves from rising (fig. CD.29 shows this method of hobbling). The camels chew their cuds while bedded down, and the Bedouin night is regularly punctuated by the various loud growlings, rumbles, and belches of ruminant digestion.

In midsummer, when the herd owners are camped continually near the water wells that usually lie at the heart of their home tribal territory, or ***dīrah,*** the herd is often managed quite differently. At this time, as noted earlier, the camels may in effect be left on their own in the country surrounding the wells and not supervised or brought to the tents at all. The camels must make do with the sparse, dry forage they can find in an area that is always overgrazed. They come in on their own every one to three days for water, then go out again. At this time of greatest heat, they often prefer to graze at night, particularly when there is good moonlight. Camels

become quite attached to their home wells and usually do not wander beyond fairly easy reach of them. Problems sometimes arise, however, when camels recently purchased from a distant area try to return "home" on their own over distances of hundreds of kilometers. Feeding and watering tends to establish a base to which the camel becomes attached, and I was told that feeding them dry dates in particular creates a tie to the feeding location. In the past during this difficult summer period, the herds often lost condition and weight and were very thin by the time the autumn move got under way. In more recent years, camel owners have adopted the practice of providing government-subsidized commercial feed, such as sacked barley, to their herds during the summer.

The camel is both a grazer and a browser, grasping tufts of grass or bunches of leaves and shoots with its prehensile lips, usually moving continually. Hilde Gauthier-Pilters (1961; Gauthier-Pilters and Dagg 1981) emphasizes that the camel by nature forages in a manner that avoids overgrazing, taking few bites from the distal parts of each shrublet and avoiding taking entire plants except sometimes in the case of annuals. This is true, but I have seen areas seriously denuded by camels where herd pressures obviously exceeded the land's carrying capacity.

It is not usual for Bedouins to cut and collect wild plants by hand (a process called ***yiḥashshūn,*** third-person pl. imperf.) for camel feeding, but they say they do this under certain conditions—for example, in caring for a sick camel that cannot go out and graze. Probably the most common plant so cut is the grass ***nuṣī*** (*Stipagrostis plumosa,* fig. CD.313), but broad-leaved plants such as ***'arfaj*** (*Rhanterium epapposum,* fig. CD.274) may also be collected and used in the same way. The tool used to cut the plants is a largish common knife or a small curved steel knife with filed serrations on the edge and a wooden handle, made by blacksmiths in the towns and called a ***maḥashsh.*** I have seen fodder cutters in the Ḥijāz carrying in loads of cut *Stipagrostis,* the grass plaited neatly into long braids, for use or sale in the town. My consultants said that the only plant too spiny for the camel to eat was the ***kidād*** shrublet (*Astragalus spinosus,* figs. CD.87, CD.88), a strong range increaser usually marking severely overgrazed land. In times of great drought, the Bedouins may be reduced to collecting these bushes and burning off the spines (***yishawwaṭūn,*** third-person pl. imperf.) to provide some fodder for their animals. A Shammarī Bedouin used the collective term ***'alīg*** for cultivated fodder,

such as barley or dried dates, sometimes given to camels. Bedouins from the more southern part of our area, Banī Hājir and Āl Murrah, said they did not use that term.

I am greatly indebted to Gauthier-Pilters (1961, 1965; Gauthier-Pilters and Dagg 1981) for her collection and analysis of camel-grazing records in the western and northwestern Sahara. These quantitative data are all the more valuable in that the environment and plant communities there are directly analogous to conditions in the central and southern parts of my study area. Many of the plant species she cites, in fact, are identical to those in my area. This work involved the monitoring of 150 normally grazing camels for a total of five hundred hours, sometimes observing a single individual eight hours at a time. The study showed that in most pastures the camels consumed 10 to 20 kg fresh weight, corresponding generally to 5 to 10 kg dry matter, of plant material per day. When grazing on the most succulent plants, halophytes or spring annuals with up to 80 percent water content, the camels ate 30 to 40 kg green weight, corresponding to 8 to 12 kg dry matter. Some individuals were found to do well for several months on a daily intake of 5 kg dry weight of the grass *Aristida (Stipagrostis) pungens,* found in the western Saharan dune lands (Gauthier-Pilters and Dagg 1981). This grass is closely related to the *Stipagrostis drarii* of sands in our study area.

Because of the camel's special need for salt, Bedouin herdsmen are always strongly concerned about achieving the proper balance in grazing between the plants known as ***ḥamḓ*** (the saltbushes) and those known as ***khillah,*** nonsaltbushes. Bedouins make the following analogy: "***Ḥamḓ*** is to camels what meat is to men, but ***khillah*** for them is like our bread." As one consultant explained, "Camels can live on ***ḥamḓ*** alone almost indefinitely if they have enough water [saltbush grazing always increases water consumption], but on ***khillah*** alone they eventually lose vigor and weight and get sick." A Bedouin describing a desert water well to another may say that the well is ***"gābiḓ al-ḥamḓ"*** or ***"gābiḓ al-khillah,"*** "grasping" the ***ḥamḓ*** or the ***khillah,*** thus conveying the important information that those plant types are dominant in the area or within easy reach of that water source. Good grazing land with ***ḥamḓ*** is said to be ***msās*** (or among northern tribes such as ar-Ruwalah, ***marī***); the opposite, land without the necessary ***ḥamḓ,*** is said to be ***wkhām.*** The two opposing terms, although apparently linked in most of my consultants' minds with the groups of

plants called ***ḥamḍ*** and their opposite, ***khillah,*** are also used more loosely in the sense of "good" and "bad" grazing areas, respectively. Always ranked among the best ***ḥamḍ*** species are ***ḍumrān*** (*Traganum nudatum,* fig. CD.323), ***rimth*** (*Haloxylon salicornicum,* figs. CD.195, CD.196) and, in the north, ***rūth*** (*Salsola vermiculata,* fig. CD.287). A folk anecdote suggests the importance of ***rūth*** to the northern tribes, relating how a Ruwalah tribesman, upon death, asked his heavenly judge whether ***rūth*** was to be found in paradise. When told that it was not, he replied that in that case he would simply prefer to go elsewhere (Mandaville 1990). A tract of land with good ***ḥamḍ*** grazing is called an ***'afjah*** (pl. ***'ifāj***), a term that usually implies the presence of a variety of saltbush species. Some saltbush species, however, are considered to be of little worth. These species comprise the stands of extremely succulent chenopods found around the lowest zones of salt flats, often near the sea but sometimes inland. Referred to collectively as ***ṭahāmīj*** (sing. ***ṭihmāj***) by a Hājīri consultant, they include ***khirrēz*** *(Halopeplis perfoliata),* ***thillēth*** (*Halocnemum strobilaceum,* figs. CD.187, CD.188), ***suwwād*** (*Suaeda vermiculata,* fig. CD.316), and ***shinān*** (*Seidlitzia rosmarinus,* fig. CD.305). Camels that graze on such obligate halophytes are said to scour excessively, dehydrate, and gain little in nutrition.

Grazing land in dry, poor condition (or during the time of such condition) is called ***maḥl*** or ***dahr,*** "drought." An area of dead plants caused by drought is referred to as ***malas,*** "barren." The other extreme, where grazing is at its very best, is called ***rabī'.*** This latter word is used in modern written Arabic and non-Bedouin spoken dialects to mean "spring" (the season of the year). Among the Bedouins, however, it is a pasture-condition term denoting only the time of lush grazing when bushes are not only in leaf but are surrounded by a rich cover of the short-lived desert annuals known collectively as ***'ishb.*** When grazing on such vegetation, the camels can go entirely without drinking. Such conditions usually occur in the spring season, yet there are spring seasons (in fact, the majority of them) when rains have not been copious enough to produce a ***rabī'*** at all (***"Mā jāna rbī' has-sanah":*** We didn't get a ***rabī'*** this year).

Apart from the "saltbush question," herdsmen are also conscious of the results of grazing on different combinations of other dominant plants. This topic seems to be of special concern in country, such as the Rub' al-Khālī, where the number of grazing species is very limited, thus offering a more

restricted range of nutrients. Thus, a Rāshidī consultant described a disease sometimes fatal for camels called ***giswār*** and caused by long pasturage on the saltbush ***ḥādh*** (*Cornulaca arabica,* figs. CD.17, CD.128) together with the nonsaltbush perennial ***zahr*** (*Tribulus arabicus,* figs. CD.324, CD.325). Grazing on ***zahr*** alone may cause a loss of condition, called ***zahr ḥamrā*** (red ***zahr***), whereas grazing on ***zahr*** with ***harm*** (*Zygophyllum mandavillei,* figs. CD.332, CD.333) or with ***ʿandab*** (*Cyperus conglomeratus,* figs. CD.140, CD.141) is considered healthy. A Marrī Bedouin, speaking also of the Rubʿ al-Khālī, said that a specific name, ***muṣṣēkh,*** is given to an especially good grazing combination comprising the grass ***sabaṭ*** (*Stipagrostis drarii,* fig. CD.312), the sedge ***ʿandab*** *(Cyperus conglomeratus),* and the boraginaceous perennial ***ḥalam*** (*Moltkiopsis ciliata,* figs. CD.240, CD.241).

The growth stage of grazing plants is also considered an important factor in their usefulness at any given time. New young growth on perennials, called ***hshēyish*** (from ***hshīsh,*** "soft, tender") is said, as would be expected, to be good grazing. When the ***ḥādh*** saltbush *(Cornulaca arabica)* of the Rubʿ al-Khālī is in its flowering stage (its flowers are apetalous, but the yellow anthers are visible in the distal stem joints), Āl Murrah and Āl Rāshid Bedouins say it is at the ***wāris*** or ***mwarras*** stage and better for camels than when without flowers. It is even better in the succeeding stage, ***jādir,*** when the young fruits are forming (fig. CD.128). After the seeds have fallen, it is called ***mrēkhī*** (a name likening it to the ***markh*** bush, *Leptadenia pyrotechnica,* which usually appears virtually leafless and smooth), and it is then said to be of less grazing value. My consultants also volunteered a number of specific "growth-stage names" for important grazing plants that everyone knew in addition to the plants' more common, general-purpose names. I believe these names exist (and they are specifically applied names, not just adjectives) because of their usefulness in conveying information about range condition; I discuss them more fully in section 5.3.

Spring season rainfall in the desert tends to be very spotty, often resulting in isolated areas of good grazing surrounded by dry vegetation that is of little use. A Marrī consultant described such a good grazing patch as a ***rugʿah*** (pl. ***rigāʿ***) if it were large and rounded, as a ***faḏkhah*** (pl. ***faḏkhāt***) if smaller and irregular, or as a ***khaṭīṭah*** (pl. ***khṭāyiṭ***) if narrow and elongated.

Important Pasture Communities. Different plant communities in our study area of course provide various qualities and quantities of grazing resources. Certainly one of the best is what I have called ***'arfaj** shrubland* (Mandaville 1990), dominated by the composite shrublet *Rhanterium epapposum* (***'arfaj,*** figs. 1.7, CD.4.) and found on well-drained sandy soils overlying limestone in the northern plains of our area. A quantitative analysis of a stand, one probably of above-average productivity, is provided in section 1.3. *Rhanterium,* ***'arfaj,*** is considered to be one of the best kinds of ***khillah*** (nonsaltbush) grazing plants, and it is especially valuable when accompanied by annuals following good rains.

An important saltbush grazing community is ***rimth*** saltbush shrubland (fig. CD.195), often consisting of extensive pure stands of *Haloxylon salicornicum* ***(rimth)*** but sometimes mixed with other chenopods. Some quantitative data for a representative stand are provided in section 1.3. *Haloxylon* provides saltbush grazing essential for maintaining the health of camel herds. The prominence of *Plantago boissieri* (figs. CD.261, CD.262) among the annuals of both the *Rhanterium* and *Haloxylon* communities is noteworthy. This *Plantago* species, known to the Bedouin herdsman as ***ribl*** or ***yanam*** is in our study area probably the single most important contributor to biomass among the annuals and is consumed in great quantities by livestock whenever annual rains are copious enough to lead to its germination and growth.

A third important grazing community is ***thmām*** grass-shrubland (Mandaville 1990) dominated by the perennial, semiwoody-based tussock grass *Panicum turgidum,* ***thmām,*** and characteristic of our central coastal lowlands (figs. 1.8, CD.8). This community is well known in Africa as well as in parts of Arabia for its grazing potential. Hilde Gauthier-Pilters and Anne Dagg describe (1981) it as one of the most productive extended pastures of the western Sahara at the time they conducted their research, where it exhibited cover on the order of 8 percent and a yield of some 1,400 kg and 800 kg fresh and dry weight per hectare, respectively. This was in a rainfall regime of 50 to 100 mm per year, very similar to my study area.

The governor of Saudi Arabia's Eastern Province for many years maintained for his personal camel herds a private grazing preserve, ***ḥimā,*** in an extensive *Panicum* area called al-Ḥabl, centered about 75 km inland from ad-Dammām. The Bedouins consider this area prime pasture because the ***thmām*** provides excellent grazing both when green and as standing hay.

It is accompanied here by the woody shrub *Calligonum comosum,* ***'abal*** (figs. CD.99–101), which is not only grazed but provides excellent firewood for the tent camps (*Panicum* is nearly useless as a fuel). The area also has good saltbush stands a few kilometers to the south, and water is available from several good wells at moderate depths. All these factors combine to provide a good example of what the Bedouins consider a near-ideal grazing area.

Along the central gulf coast in Tārūt Bay, camels were occasionally seen to walk out into the intertidal zone and graze on ***gurm*** (the mangrove, *Avicennia marina*). A Bedouin of the Banī Khālid coastal tribe told me that such grazing ***"yisamman al-bil wal-ghanam"*** (fattens the camels and the flocks). A Hājirī consultant (who was also a camel owner in the coastal area) demurred, saying mangrove was actually not very good grazing. The mangrove stands once extensive in Tārūt Bay in the vicinity of al-Qaṭīf have been largely destroyed by coastal land filling.

Many of my consultants agreed that camels especially liked certain plants, and some of these plants are identical with or very closely related to camel-preferred species listed by Gauthier-Pilters in the western Sahara. Among the dozen or so common saltbushes, ***ḏumrān*** (*Traganum nudatum,* fig. CD.323) is often mentioned as being strongly sought after by camels. On several occasions, I was told that ***ḥazzā*** (*Deverra triradiata,* fig. CD.142) was also a favorite, indicating a cameline penchant for an aromatic umbellifer. According to Āl Murrah consultants, milk camels have a great fondness for ***karī*** (*Heliotropium digynum,* fig. CD.202), and camels in general seek out ***msēkah*** (*Haplophyllum tuberculatum,* figs. CD.197, CD.198). They are said to be able to locate the latter by its scent (which is strong and unpleasant to the human nose) from considerable distance.

On at least one occasion, I heard Bedouins describe some plants as ***ḥārr*** (hot, as in spicy or peppery), saying they were not very good grazing. A specific example was the shrublet ***'algā*** (*Dipterygium glaucum,* fig. CD.150), which was said to be "hot" and not very good fodder, as is ***jathjāth*** (another perennial, *Pulicaria undulata,* figs. CD.269, CD.270). *Dipterygium* does in fact have a rather mustardy taste.

4.1.2 Toxic and Noxious Plants

Toxic plants are a minor problem for camel herders in eastern Arabia because camels tend naturally to avoid those plants that are dangerous.

Several plants were pointed out to me as poisonous or dangerous to livestock:

shajarat ad-dābb (snake bush), ***ʻishrig*** (a senna, *Cassia italica,* figs. CD.111, CD.112): This low, bushy legume is found occasionally on heavier silt soils.

ʻushar, ʻishar (*Calotropis procera,* fig. CD.106): This milkweed family perennial of near-tree stature is found around the edges of towns and sometimes on inland shallow sands and wadis. An elder Qaḥṭānī consultant said this plant, although avoided by camels, is sometimes eaten by sheep or goats without ill effect.

labnah, ḥillab *(Euphorbia granulata):* Both names are derived from words referring to milk, which the sap resembles. This prostrate euphorbia is not uncommon on disturbed ground and on the floors of some inland wadis. Violet Dickson reported two other euphorbias from the Kuwait area that are said to be poisonous: ***ghaẓālah*** (*Euphorbia retusa,* figs. CD.172, CD.173), for which I recorded the name ***ʻiḏat al-hāyish)*** and *Euphorbia* sp. cf. *hieroglyphica* (1955, 40–43). At least the former occurs in the study territory.

jār (unidentified): A Qaḥṭānī consultant described this species as a "plant with white milk, avoided by camels. If they should eat it, they would die." Said to have strongly green leaves "like a fig tree," this plant apparently does not grow in our study area but might be found in Qaḥṭān territory in western Arabia, where there is a greater admixture of the African flora.

ḥanwah ("crookweed," referring to the curved achene of this wild marigold, *Calendula tripterocarpa,* fig. CD.98): Bedouins of Banī Hājir and other tribes say this plant is injurious to camels when grazed in any quantity, leading to bloat and other disorders.

nafal, shmaṭrī *(Trigonella stellata):* This fragrant annual legume, although not considered poisonous, is said to sometimes cause bloat in livestock. *Trigonella anguina* is known by the same names and may also be implicated in this problem.

thillēth (*Halocnemum strobilaceum,* figs. CD.187, CD.188): H.R. P. Dickson reported a herdsman's belief that overgrazing on this salt marsh succulent can cause a lung disease in camels.

ward kadhdhāb (oleander, *Nerium oleander*): This plant is as strongly toxic to the camel as it is to most other mammals (Leese ca. 1927; Gauthier-Pilters and Dagg 1981). Within the study area, it occurs only

around towns and the oases and is unlikely to pose a threat to desert grazing camels. An oasis dweller gave me the name ***ward kadhdhāb,*** which means "false rose" or, literally, "liar rose."

Other plants that camels are said to avoid, although they are not described as strongly poisonous, are:

ḥarmal (*Rhazya stricta,* figs. CD.276, CD.277): An inland desert shrublet, a medicinal, of the same family as the oleander (Apocynaceae) and somewhat resembling it, sometimes forming pure stands. It is generally acknowledged to be somewhat toxic but not really dangerous because camels avoid it.

sharī, ḥanḏal (*Citrullus colocynthis,* the colocynth gourd, fig. CD.122): This creeper of silty wadi bottoms is said to be avoided by camels but to be eaten sometimes by sheep, goats, and donkeys.

jathjāth (*Pulicaria undulata,* figs. CD.269, CD.270): This composite shrublet somewhat resembles the highly palatable ***'arfaj,*** *Rhanterium epapposum,* and is found on inland silt basins.

karrāth, kirrēth (*Allium sphaerocephalum,* fig. CD.56): Camels are said to avoid this strong-tasting wild onion.

'unṣēl (*Gynandriris sisyrinchium,* figs. CD.185, CD.186): Violet Dickson (1955) noted that in the Kuwait area this wild iris is considered bitter and seldom grazed by livestock.

barwag, bērag (*Asphodelus tenuifolius,* figs. CD.75, CD.76): Āl Murrah consultants say livestock generally avoid this asphodel, which is common around disturbed ground such as abandoned desert campsites.

sāf, sakhbar, idhkhir (*Cymbopogon commutatus,* figs. CD.134, CD.135): A Dawsarī consultant said that camels generally avoid this fragrant grass, discussed as a medicinal in section 4.4.

Some plants present physical problems to grazing livestock. The annual grass ***ṣam'ā*** (literally "sharp grass," *Stipa capensis,* fig. CD.310) is considered noxious when its long, sharp awns have fully formed and dried because they may penetrate the grazing animals' mouth parts. When the grass is young and green, or after the awns have fallen, it may be grazed safely. I was told that the succulent-leaved bush called ***harm*** (*Zygophyllum qatarense, Z. mandavillei,* figs. CD.334, CD.333) has rather indigestible stems that are liable to cause puncture or obstruction (the latter called ***'ikām*** by a Rāshidī consultant) to the intestinal tract, leading to death. Not all camels will graze on this plant; those that do so are sometimes

referred to as ***hwārim*** (sing. ***hārimah,*** grammatically an active participle derived from the plant name). A viscid annual, ***tarbah*** (*Silene villosa,* fig. CD.307), is often covered with adherent sand and can cause sand colic in sheep that graze on it heavily. The same name, which is derived from the word for "earth" or "dust" ***(tarb, trāb)*** is applied to another plant that tends to be covered with sand: the dwarf annual composite *Ifloga spicata* (fig. CD.216).

4.2 Fuel and Fire Making

Next to grazing for livestock, the collection of firewood, ***ḥaṭab,*** is the most important use the Bedouins made of plants at the time of my fieldwork. True, in recent decades utility has begun to reign on the women's, or family, side of the tent, where cooking may now be done on low, cast-iron burners fed by bottled petroleum gas obtained in the town. On the men's or guest side of the divider, however, only a traditional fire using ***ḥaṭab*** is still considered proper for the brewing of coffee and tea and the general entertainment of guests. Until about 1960, even some traditional houses in the towns maintained a small, wood-burning coffee hearth in the ***majlis,*** or men's living room, which had some means of venting smoke to the outside.

It should be noted at the outset that the Western notion of "firewood"—that is, a neat stack of cut and split sections of tree trunks and limbs—is unknown to the Bedouins. Because tree forms are virtually absent in the natural vegetation of eastern and northern Arabia, the Bedouin depends entirely on bushes and shrubs for fuel. A large, irregular pile of cut or uprooted shrublets usually sits near one side of the men's tent section, where it often serves also as a windbreak for both man and livestock. The stack is often replenished at its back (the side away from the tent), while immediate fuel needs are taken from its front. This process allows a certain amount of drying, reinforced by the nearby fire, of bushes that are sometimes collected rather green. The arrival of an unexpected guest usually results in an immediate cry of ***"Jīb ḥaṭab!"*** "Bring firewood!" A younger son of the family will quickly respond by bringing additional branches to the shallow fire pit, which is kept banked or smoldering at all times. Small pieces and then larger ones are piled on, and the old coals are fanned until the new fuel bursts into flame. When good, woody chunks of

favored shrubs such as ***'abal*** (fig. CD.103) or ***ghaḍā*** (fig. CD.23) are at hand, they can be put directly on the fire after some preliminary breaking. Smaller shrublets often have to be used whole, however, and need to be crushed down, usually by foot, to increase their density; otherwise, they will not burn completely.

Different kinds of firewood are valued, as might be expected, roughly in proportion to the amount of heavy woody material they can provide. The larger, woody shrubs are thus always chosen, if available. Thin-branched bushes are burned only if nothing else is at hand or to act as kindling for the starting of a camel dung ***(jallah)*** fire (fig. 4.4). Camel dung is usually not used if good fuel shrubs are available. Being composed of compressed bits of finely divided plant material, like the charcoal briquettes of the American barbecue, dung has some of the burning characteristics of briquettes (including the formation of coals). It is smoky and smelly when first set alight, however, and does not produce light at night in the form of cheery flames. Providing such light at night for the entertainment of guests, storytelling, and other social situations is another function of the ***majlis*** fire. In the 1960s, my Bedouin hosts also usually had a kerosene lantern or two at hand and a battery flashlight (which my Āl Murrah friends called a ***bajlī,*** a term that I can interpret only as a twist on the English word *battery*).

The collection of firewood is considered women and children's work, although men will pitch in to meet special needs. The portion of a shrub favored for firewood use is that part called the ***jirm*** (pl. ***jrūm***), the root crown at the base of the bush that includes parts of the larger roots as well as the bases of larger branches. The term ***jirm*** means "body" (that is, the main, heavier part of the overall plant) and seems to be used only in connection with firewood; another name is used for that part of the shrub in general-purpose anatomical nomenclature (see section 5.2). The shrub, or its base if it is dead, may simply be pulled out of the sandy ground with the hands. Either of two tools often found at any Bedouin tent may also be used. One is a short-handled hoe, called a ***misḥāh,*** used to grub out the bases of shrubs (and for other purposes, such as digging drainage channels around the tent when it rains heavily). The other, which some groups call a ***fārū',*** is a mattocklike, double-headed implement with a wooden handle less than a meter long; the iron head is a light ax opposed by a narrow-bladed hoe or chopper with blade at a right angle. I have rarely seen

the ax side used for chopping, although a woody branch may be struck simply to break it. The other end of the blade is more often used like the hoe to dig out the shrubs' woody bases or as a hook to extend one's reach. Fuel gathering is easiest when the collector happens to be in an area where the bushes have died as a result of local drought, but recently enough that the shrub bases have not yet decayed or become riddled with termites. The bases then pull out easily and are almost entirely burnable fuel without green leaves.

The availability of firewood is always a factor in the choice of campsites, but there are times when the spotty distribution of spring annuals or special grazing needs require camping in areas without good fuel. In such cases and especially when moving by truck, a family makes stops during travel to the new site to pull up good firewood and pile it on top of the household load. They also pick up additional loads along the way on trips to town, or they can later make special trips for wood gathering from the camp.

The favored firewood plants in northeastern Arabia are ***ʿabal*** (called ***arṭā*** in the farther north) and ***ghaḏā,*** both good-size shrubs with bases, roots, and lower branches of fairly heavy wood. The first, ***ʿabal,*** is the polygonaceous *Calligonum comosum,* which has a similar counterpart of the same Arabic name and use in the Rubʿ al-Khālī sands, *Calligonum crinitum* subsp. *arabicum* (fig. CD.102). *Calligonum* is often particularly useful because it may be found scattered in plant communities otherwise dominated by perennials of high grazing value but poor firewood value, such as ***thmām*** (the grass *Panicum turgidum*) and ***ʿarfaj*** (the composite *Rhanterium epapposum*). In large parts of the Rubʿ al-Khālī, *Calligonum* is virtually the only woody plant available at all. ***Ghaḏā*** (*Haloxylon persicum,* fig. CD.23), a large woody saltbush sometimes reaching almost tree stature, is always chosen for firewood when available, but it does not have a very widespread distribution and is found only in certain deep and mobile sand environments where good grazing is often not available. It burns long with a clear flame and little smoke and is used particularly in parts of the northern Rubʿ al-Khālī and in the Great Nafūd and adjoining sands of northern Arabia. Consultants said that in earlier times of intertribal strife (before the 1930s) desert raiding parties would always use ***ghaḏā*** for their daytime campfires when available because it gave off little smoke that might give their position away to enemies. In such circumstances, fires at night were totally avoided.

Nearly any of the other saltbushes, except some very succulent species found around salt flats and salt marshes, are considered fairly good firewood. ***Rimth*** *(Haloxylon salicornicum)* is often used when Bedouins camp in the extensive grazing lands dominated by this shrub.

Some bushes are generally avoided for firewood use. An example is ***harm*** (*Zygophyllum mandavillei* and *Z. qatarense,* figs. CD.333, CD.334), which has highly succulent leaves and small, weak branches and stems. It is considered as useless for ***ḥaṭab.*** The shrublike grass ***thmām*** *(Panicum turgidum)* bears little material that is solid wood and when dry burns too quickly for practical use, but its culms are used as kindling to start fires of better wood or of camel dung. The ***ʻarfaj*** shrublet *(Rhanterium epapposum)* dominates thousands of square kilometers of good grazing land, but its stems are weak and thin. When green, it produces thick clouds of smoke, and when dry, it burns too quickly for cooking or even for persistent light. Like ***thmām,*** it is used when dry as kindling to start fires of better ***ḥaṭab*** or dried camel dung. Violet Dickson (1955) wrote of the use of ***ʻarfaj*** as firewood in Kuwait, used by both Bedouins and townfolk, and reported the denuding of the country around Kuwait town by this use. I think this happened because no better shrubs were within easy reach. Excessive use is easy to understand, for it takes great quantities of ***ʻarfaj*** shrublets, which burn like tinder when dry, to maintain a useful fire and build up much coals.

The Bedouins also use fires as signals. Once while I was hunting hares on the northern plains on a cloudy and rainy night with Āl Murrah friends, even my guide lost the precise direction of the home tent after continuous zigzagging in the car in pursuit of our quarry and with no stars in view. He directed me to a raised piece of ground and built a quick big fire of ***rimth*** bushes. As I remember, he did not even pull the shrubs out of the ground but just stamped each one down to compact it, asked me to add a bit of gasoline, and lit it in place. People at the tent several miles away saw our light, and they responded by building a fire beacon for our easy return.

Before the use of matches in Arabia, certain plants were also used as tinder in the starting of fires, which was generally accomplished with flint and steel. In the 1960s, one of my Āl Rāshid consultants of the southern Rubʻ al-Khālī still had a flint and steel set (the steel being a triangle-like implement called a ***znād***) that he gave me as a gift and taught me to use by catching the spark in a wad of charred cotton wool or cotton cloth.

Several other tinders were commonly used in earlier times. Use of the fine, silky hair tufts on the seeds of the ***markh*** shrub (*Leptadenia pyrotechnica,* fig. CD.224) for this purpose has been widespread in Arabia. This use was the basis for the specific epithet *pyrotechnica* given the plant by Peter Forsskal, who probably saw it during his botanical explorations in southwestern Arabia in 1762–63.

A Shammarī consultant told me that the cottony indumentum on leaves of the spiny thistle called ***kharshaf*** (probably *Echinops blancheanus*, fig. CD.152, or *E. mandavillei,* fig. CD.154), a plant of the Great Nafūd sands in northern Arabia, was also used as tinder for fire making. It no doubt corresponds to the plant called ***ḥarshaf*** by the Ruwalah and attributed by Musil to *Echinops ceratophorus* (1927, 603). The leaves, my consultant said, were pounded when still green to loosen the "cotton," which was then separated and saved for use as tinder. He added that gunpowder was often added to this material to better catch the spark and start combustion. Musil noted that the Ruwalah of northern Arabia used for tinder "powdered" material from the gray-tomentose composite ***shīḥ*** (*Artemisia sieberi,* fig. CD.74). They also used an unidentified "mallowlike" herb called ***gṭēn*** or ***gṭēyin*** (my transliteration; see Musil 1928a, 128, 700). My consultants used very similar names (which mean "little cotton" or "cottonwort") for *Bassia eriophora* (fig. CD.93), a chenopodiaceous annual that has dense, cottonlike fleece around its flowering perianth and that is probably the plant the Ruwalah referred to. Musil also described how after the smoldering tinder caught a spark, it was placed in a piece of dry ***shīḥ*** and whirled above the head until it burst into flame (1928a, 100). ***Shīḥ*** is highly aromatic, which must have added a pleasant touch to the procedure. Also, in describing a piece of Bedouin poetry, Musil mentioned how fire was passed around among tents of the Ruwalah, presumably when arriving at a new campsite. When a fire was started by one woman, other families would send a girl or servant over to fetch a starter for their own hearths. Each girl would put a glowing coal into a wisp, ***migbās,*** made of the dry plant ***shīḥ*** or ***ghaḏā*** or ***arṭā (ʻabal)*** and swing it in the air until it ignited (1928a, 473).

A Rāshidī consultant told me that before matches became common, the desert Arabs also used to make fire by twirling a stick between their palms in a small depression in a piece of ***ʻabal*** wood (*Calligonum comosun* or *C. crinitum* subsp. *arabicum).* This was the only reference I heard

to making fire by friction. My notes do not mention what the twirling stick was made of—presumably a harder wood.

The Bedouins' collection of firewood no doubt appears to be environmentally destructive, often involving as it does the complete uprooting and virtual eradication of individual shrubs. In my experience, however, it seldom has great impact on plant communities mainly because Bedouin grazing camp groups are usually of small size and move frequently, thus diffusing the pressure of use and minimizing the extent of shrub destruction at any one site. Bedouins are also selective in their fuel use, preferring shrubs already dead or poorly growing from natural causes, such as local drought. Of course, in summer camps of the past, where groups of hundreds of tents were pitched around the tribal home wells, such as the great summer camps of Muṭayr gathered in the Ṣummān at al-Liṣāfah and al-Lihābah, woody plants would be heavily impacted around such sites. These places, however, had reduced populations during much of the grazing year, and the collection of firewood by people of the villages and towns was probably thus more destructive. When I was working in Riyadh in the 1960s, firewood was still being used in parts of the city for everyday cooking and heating, and the city had a permanent and active firewood market area. Here, huge truckloads of *Acacia* and other wood were brought in from the uplands of central and southern Najd to meet the demand. Most of such household use has fortunately ceased with the widespread substitution of petroleum fuels.

4.3 Wild Plants for Food

Bedouins in Arabia gather and use wild plant foods primarily as seasonal dainties to enliven a diet that is otherwise rather tasteless and bland, historically consisting mainly of milk products and one or two staple grains. These wild plants no doubt have also played a nutritional role by their provision of vitamins or other nutrients that might be lacking in staple foods. There is some evidence of the earlier use of a few wild plants in times of famine, but availability of such famine foods in the study area's desert vegetation is limited by the fact that the drought conditions that lead to livestock losses through poor grazing also limit the development of wild food plants. There are very few usable drought-resistant perennials. Plants producing seeds that can be saved "for a rainy day" or, rather,

for a “rainless day” are exceptions—an example being ***samḥ*** (described later). A third use of wild plants is their small-scale employment as additives for the spicing or preservation of other food items.

At the time of my data collection in the early 1960s, knowledge of wild food plants was still widespread among the Bedouin population. I also saw children out collecting wild edibles, indicating that this knowledge was being passed on to the younger generation. In fact, the number of edible species that I recorded was greater than that noted by Musil (1928a) in his ethnographic work describing the Ruwalah Bedouins of northern Arabia in the first decade of the twentieth century. There does, however, appear to have been a decline in the number of plants whose greens are eaten raw, as indicated by the comparison of present practice with references in earlier literature. Such salad plants tend to have some characteristics in common, such as glabrous, somewhat succulent leaves and annual habit.

Without doubt, the most important wild food plant for the Bedouins has been (if we informally accept fungi into the plant kingdom) the desert truffle. Truffles are the only wild food plant that I have known to be collected for sale to the settled population. They are also the exception to the general trend toward a diminishing interest in wild plant foods as the burgeoning economy of the Arabian Peninsula has made available an increasing market variety of vegetables and fruits to which today’s desert dweller has easy vehicular access.

The list of edible plants given here fairly represents, I believe, the range of knowledge of an average Bedouin of any tribe in my greater study area, although a few items are specific to either the southern or the northern extremity of this area. I include uses noted in literature that are in some cases at variance with my findings. The arrangement is by plant parts, setting aside the important fungi for the end.

4.3.1 Roots, Tubers, and Bulbs

‘anṣalān, *Dipcadi erythraeum* Webb. et Berth. (Liliaceae) (figs. CD.143, CD.144): Violet Dickson stated that the bulb of this plant is juicy and sweet and that it is eaten by Bedouin children (1955, 38). My experience is quite different; consultants said the plant is not edible, and I found the bulb extremely bitter.

ḥambizān, ḥimbāzah, ḥimbēz, ʻambaṣīṣ, *Emex spinosa* (L.) Campd. (Polygonaceae) (fig. CD.159): All Bedouins know this spring annual for its sweet, carrotlike taproot. The plant has a basal rosette of petioled leaves and is sometimes tinged with red. The taproot is thickened, whitish, and carrot shaped and usually ranges between 2 and 15 cm long. It is dug up, washed, and eaten raw. I frequently ate it and found it sweet, with a pleasantly crisp texture. According to Desmond Vesey-Fitzgerald, the Bedouins also pluck and eat the petioles (1957, 791).

karrāth, kirrēth, baṣal, *Allium sphaerocephalum* L. (Liliaceae) (fig. CD.56): The synonym ***baṣal,*** used by Āl Murrah, is generally applied to the cultivated onion. This wild onion has a tall scape up to a meter high and flowers in a large spherical umbel 3 to 5 cm in diameter. It is usually found on sandy ground. Āl Murrah consultants told me the leaves are eaten but not the bulb. I have tried the bulb and found it excessively strong. Musil stated that the bulb was collected and eaten among the Ruwalah (1928a, 15). A member of that tribe told me, however, that the bulb is not eaten, but that the fresh, fragrant flowers are used with rice and are sometimes dried for use as a spice in other food. A Shammarī consultant agreed. Others told me that the same inflorescence, called a ***zirjah*** (pl. ***ziraj***), was dried and put into ***samn*** (liquid clarified butter) for flavoring.

mḥarūt: Musil attributed this name to *Scorodosma arabica* Vel. (Umbelliferae), but that botanical name did not persist, and this plant is probably now classed as a *Ferula,* perhaps *F. blanchei* Boiss. or F. *rutbaensis* C. C. Townsend. This Bedouin food plant does not occur in our core study area, and I have no personal experience of its use, but Musil's description is too interesting to neglect. He described finding the plant in the northern desert in the borderlands of present Saudi Arabia and Iraq: "The leaves of this plant are a greenish vermilion in color and look as if they were covered with a white veil; the blossoms grow in yellow clusters, the root is long, black, and as thick as one's hand. The new plant emits a peculiar odor, which also emanates from camels after they have grazed long upon it. The Bedouins drive milch camels away from it as it would also give their milk the unpleasant smell. At first the camels enjoy the *mḥarût* but soon they seek *rûṯe* or *šîḥ*" (1927, 270–71). He also reported the digging up of three roots on another occasion: "These were of the thickness of a hand, forty to sixty centimeters long, and had a black

rind. Miz'el discarded two of them, explaining that they were males and had a bitter taste; the third root, a female, we took along." Describing the eating of the root, which was laid near a fire and baked, he continued: "Underneath the black rind was a white edible substance with a somewhat pungent taste and as dry as flour" (222–23). The attribution of gender to the roots or the plants themselves (although the plant is not dioecious) is of interest. I did not find such a practice in my main study area but noted it in Dhufar, southern Arabia, where tribesmen showed me their (nondioecious) frankincense trees *(Boswellia sacra)* and said that the "female" trees were "fatter" and produced more resin.

rubaḥlah, *Scorzonera papposa* DC. (Compositae) (fig. CD.303): Very well known to all Bedouins, this small perennial with showy pink flowers has an edible, dark brown–skinned tuber on its root. Violet Dickson likened its flavor to that of a Brazil nut (1955, 86). The plant is usually seen on elevated, rocky ground, and I found that digging up the tuber can be difficult. It is often at considerable depth, and the root leading to it is often wedged in rock cracks and difficult to follow without breaking. The tubers are generally dug in the spring, when their locations are well marked by the plant's showy pink flowers. A Marrī consultant recited for me the following short rhyming line about this plant: ***". . . ar-rubaḥlah wat-tamr aḥlā"*** (. . . the ***rubaḥlah*** and [but] dates are sweeter), apparently the end of a longer line of verse.

shaḥḥūm, *Gagea reticulata* (Pall.) Schult. et Schult. f. (Liliaceae) (figs. CD.181, CD.182): This plant is a yellow-flowered dwarf lily usually found on rocky terrain. Musil listed it as a plant (presumably the bulb) consumed raw by the Ruwalah (1928a, 95), but consultants told me that it is not eaten in the study area. I once tried a bulb and found it bitter. Economic botanist Humphrey Carter, describing this species collected in the Kuwait hinterland, said, "Men have no use for it and animals do not graze on it so that, in spite of its being so common, few Bedouins can name it" (1917, 179).

ṭīṭ, *Allium sindjarense* Boiss. et Hausskn. ex Regel (Liliaceae) (fig. CD.55): This small wild onion of silty soils in our northern parts is well known as an edible plant. Musil described how, among the Ruwalah, mothers sent out their boys to collect the bulbs, saying, "My little sons, O sonnies! go bring me *aṭ-ṭîṭa.* I will prepare for you *muṭîṭa* (a dish of mashed bulbs)" (1928a, 15).

4.3.2 Edible Stalks or Stems

'abal, *Calligonum comosum* L'Hérit. and *Calligonum crinitum* Boiss. subsp. *arabicum* (Sosk.) Sosk. (Polygonaceae) (figs. CD.99–101, CD.102–4): The latter species is referred to here, but the use may extend to the former. Both are virtually leafless shrubs with very fine terminal stems. One of the British explorer H. St. John Philby's al-Manāṣīr traveling companions, during Philby's crossing of the Rub' al-Khālī in 1932, cooked green sprigs of ***'abal*** with rice to make for the company a dish called ***makīkah.*** Philby noted that it made a "tolerable substitute for fresh vegetables—rather tasteless but in no way disagreeable." He added that another tribe of the Rub' al-Khālī, Āl Murrah, did not ordinarily know this use (1933, 171). He added later that at the suggestion of his Manṣūrī guides he had "browsed freely on the white blossoms and tender green sprigs of the *Abal* as we marched" and that he could vouch for its claimed medicinal properties; it is to some degree constipating and acts thus to offset the purgative effect of drinking mineral-laden well water (195–96). Philby's guides also advised him not to eat ***'abal*** along with meat, which they claimed was "liable to harden to the consistency of leather" because of the ***'abal*** (278). They said this about the hardening of meat probably because of another use of the plant—for tanning (see section 4.5). The party also made use of the twigs for brewing a tea substitute. Philby noted that "its colour was all that could be desired but the liquid was somewhat bitter to taste and constipating in its effect—an antidote, as I was to learn, to the powerful salts of the Naifa water" (278–79).

ṭarthūth, zibb al-arḏ, *Cynomorium coccineum* L. (Cynomoriaceae) (figs. CD.136–39): This striking club-shaped, crimson root parasite appears as fleshy, leafless stalks topped by a dense inflorescence of closely packed dark red flowers. The stalk extends 30 cm or more underground and is the edible part. It is prepared simply by washing and peeling off the skin to expose the fleshy interior. Bedouin elders of the Dhahran area told me that villagers from al-Qaṭīf, in the days before oil, used to go out in the neighboring desert in spring and dig up donkey loads of ***ṭarthūth*** to sell in local markets as a seasonal delicacy or tonic. R. E. Cheesman, describing the natural history of the al-Ḥasā oasis during his travels in eastern Arabia in 1923–24, noted that "the fat, succulent underground stems of the *Tarthuth* are on sale in the bazaar every day. The badawin women

bring them in, and the townspeople buy them freely and eat them raw" (1926, 199).

The plant was generally described to me as edible, but my own experiments with it had mixed results. Some plants had a sweetish taste and pleasantly crisp, succulent texture. These specimens, however, grew randomly along with other individuals of the same age that were quite bitter, astringent, and, for me, inedible. Musil commented that the Ruwalah ate this plant baked (1928a, 95). Violet Dickson said it was much eaten by children in Kuwait and that it has a sweet taste as well as a slight purgative effect (1955, 37).

This plant's phallic form has led to a Bedouin repertoire of associated ribald names and stories, the quaintest of which is perhaps the one told to the English explorer H. St. John Philby by one of his travel companions during his trip in 1918 down to Wādī ad-Dawāsir in southern Najd (1922, 2:215–16). According to this campfire tale, which I paraphrase, a Bedouin chief of a tribe highly skilled in the art of tracking both livestock and people in the sands was riding with some companions when he spotted the foot tracks of his daughter, who had gone out from the tent that morning to gather ***nuṣī*** grass for the camels. As the men were returning in the evening, the chief spotted his daughter's tracks again, this time returning to the tent. At the sight of this second set of tracks, the chief threw up his hands in consternation, saying, "See how my daughter went out in the morning a virgin, but when she returned, she was no longer so!" (Bedouins today still say that good trackers can tell a virgin from a nonvirgin by a glance at a girl's tracks. This is no doubt an exaggeration, although the difference between the tracks of a girl and those of a mature woman are probably evident enough.) "Now," said the chief, "I will have to hunt down the man who dishonored her and kill him, and she herself," he added sorrowfully, "will have to die to save the honor of the tribe. Let us ride back along this trail and pick up the tracks of the perpetrator." They did so, following them back until they ended at a patch of ***ṭarthūth*** plants, growing in the sand, some of them pulled out. The distraught father stopped, reading the sands carefully, then smiled with relief and raised his hands to heaven in thanks. He had interpreted the earlier tracks correctly, but—as he then declaimed—he had wronged his daughter, not only by assuming her guilt, but by keeping her too long unwed. As the repeater of this tale, I can only second Philby's own epilogue to it: "si non è vero è ben trovato."

dhnūn, *Orobanche* sp. (Orobanchaceae) (figs. CD.252–54): Musil lists *Orobanche,* under the synonym ***zibb adh-dhīkh,*** among other plants eaten baked by the Ruwalah in northern Arabia (1928a, 95). There are four species of this parasitic genus in our study area, and this is probably one of them. I have never, however, heard of any of them being considered edible. Musil's vernacular name is also unknown to me from the more restricted study area, but Joseph Hobbs collected it in the Eastern Desert of Egypt for *Cistanche phelypaea* (= *C. tubulosa*) (1989, 126), another columnar root parasite of the same family and of generally similar appearance that is known in eastern Arabia as ***dhānūn.*** The Bedouins do not eat *Cistanche* (I can confirm that it has a bitter taste), although there are records of its consumption in the Sahara, where the Tuareg of Ahaggar dry it and pound it for bread (Nicolaisen 1963, 178).

4.3.3 Greens Eaten Raw

basbās, *Anisosciadium lanatum* Boiss. (Umbelliferae) (figs. CD.66, CD.67): Violet Dickson reported the young green leaves of this plant eaten by Bedouin children (1955, 19). I have not otherwise heard of its being considered edible.

gurrēṣ, garrāṣ, *Aaronsohnia factorovskyi* Warbg. et Eig (Compositae) (fig. CD.45): Musil also listed this name for *Trigonella hamosa* L. (1928a, 700), but I believe this assignment might be an error; the same name is seldom given to plants from families as different as legumes and composites, and there are semantic reasons (see the list of generics in chapter 6) that reinforce its attachment to the common *Aaronsohnia* or possibly also to another composite resembling it. Carter's ascription of the name to "*Matricaria* sp." may have been a mix-up of plants or names (1917, 203). ***Gurrēs*** is said to be eaten raw by the Bedouins and to be one of the several plants used as a spice or other additive in the preparation of ***igṭ,*** the dry soured milk cheese cakes (Dickson 1955, 11, perhaps following Carter 1917, 203).

ḥambaṣīṣ, ḥamṣīṣ, *Rumex pictus* Forssk. (Polygonaceae) (fig. CD.281): The leaves of this low annual dock are eaten uncooked. *R. pictus* is usually found in sand terrain and differs from *R. vesicarius* (see under ***ḥummēḍ***) in its pinnately parted leaves.

ḥārrah, *Sisymbrium irio* L. (Cruciferae): Musil reported this plant as one of those eaten raw by the Ruwalah (1928a, 95). It is a weedy species usually found only on disturbed ground around campsites.

ḥummēḏ, ḥammāḏ, ḥambāḏ, *Rumex vesicarius* L. (Polygonaceae) (figs. CD.282–84): This plant is a glabrous, somewhat succulent-leaved annual up to about 30 cm high. The fruiting perianth of the flowers grows to become quite showy, the bright pink to reddish valves winged and with red nerves. Use of the plant as a sour-tasting salad vegetable is well known to all Bedouins. According to a Hājirī consultant, the plant is sometimes added during the preparation of ***igṭ*** to increase its acidity. Carter reported that it is also eaten cooked, with meat (1917, 181). A Shammarī consultant told me the story of a raider of his tribe who was wounded in one of the battles waged by Ibn Rashīd, the former Shammar chief. He was said to have spent six days sheltering in a waterless ***daḥl*** (a natural solution cave in the limestone floor of the desert), living entirely on the wild ***ḥummēḏ*** plants that grew in the vicinity. He survived but was said to have entirely lost his power of speech due to the plant's astringency.

ḥuwwā, *Launaea capitata* (Spreng.) Dandy, *L. nudicaulis* (L.) Hook. f., *L. procumbens* (Roxb.) Ramayya et Rajagopal, and possibly other species of low, annual, yellow-flowered composites of the section Liguliflorae (Compositae) (figs. CD.219–23): Musil attributed this name (as *ḥawwa')* to *Lagoseris bifida,* which is probably identical to our *Crepis asper* L. (1927, 603). His description of ***ḥuwwā*** as a variety of ***samḥ*** (1928a, 15) may be an error. ***Ḥuwwā*** as a raw salad herb is well known to all Bedouins and references to it often involve some aspect of disdain, as if it were resorted to only by the poorest folk in dire need. Whenever one of my Āl Murrah consultants heard the name mentioned, he would smile and recite a fragment of a song: ***"Man kal al-ḥuwwā talawwā; awja' baṭnah wa māt"*** (Whoever ate the ***ḥuwwā*** writhed; his stomach ached, and he died).

ḥwērrah, *Leptaleum filifolium* (Willd.) DC. (Compositae): The Bedouins eat this fine-leaved dwarf annual, according to Violet Dickson, for its peppery taste (1955, 59–60).

khinnēz, ḏurrēt an-na'ām, 'ifēnah, *Cleome amblyocarpa* Barr. et Murb. (Capparaceae) (fig. CD.123): Musil listed this plant (as a synonym, *C. arabica*) among those eaten raw (1928a, 95). I think his listing in this case is at least questionable, for the plant is generally considered noxiously

fetid, as indicated by its names, which mean, respectively, "stink weed," "ostrich fart," and "stench weed."

krāʻ al-ghurāb, rijlat al-ghurāb, shakhīṣ, jirjīr, *Senecio glaucus* L. subsp. *coronopifolius* (Maire) Alexander (Compositae) (fig. CD.306): This ascending, annual herb has somewhat succulent, tender leaves eaten raw as a salad green.

liḥyat at-tēs, liḥyat ash-shēbah, dhignūn, dhuʻlūg, thuʻlūg (the latter clearly pronounced by a Qaḥṭāni consultant; Philby also found that form in south central Arabia [1922, 2:312]), *Koelpinia linearis* Pall. (Compositae) (fig. CD.217): A Banī Hājir consultant told me that this fine-leaved annual is eaten raw, and both Carter (1917) and Musil (1928a) listed it as edible.

mashʻ (Musil 1928a, 702), ***dhuʻlūg, dhuʻlug al-jamal*** (Musil 1927, 595; 1928a, 95), *Scorzonera tortuosissima* Boiss. (Compositae): Velenovsky's *S. musilii,* as listed by Musil, is probably conspecific with this plant. Musil listed this yellow-flowered perennial as edible, but there may be confusion here with *Koelpinia linearis,* which is also given the name ***dhaʻlūg*** and somewhat resembles this *Scorzonera* except when in mature fruit. The name ***mashʻ*** was given me in an oral list of edibles by a Shammarī knowledgeable about the northern flora, but I am not sure whether he was referring to this plant or to *Koelpinia linearis.*

Ophioglossum polyphyllum A. Braun. (Ophioglossaceae, fig. CD.251): Violet Dickson reported that Bedouin children ate this dwarf annual fern of sand terrain (in Burtt and Lewis 1949, 279). I collected it in my study area, but it does not appear to have a recognized vernacular name.

ragam, tummēr, bkhatrī, *Erodium* spp. (Geraneaceae) (figs. CD.165–70): Musil noted such use of four species under two vernacular names: ***tummēr,*** *Erodium bryoniifolium* Boiss., *E. ciconium* (L.) L'Hér.; and ***bkhatrī,*** *Erodium cicutarium* L., *E. pulverulentum* (Cav.) Willd (1928a, 95). *E. cicutarium* was probably in fact *E. deserti* Eig, which rather closely resembles *cicutarium; E. pulverulentum* is now considered a variety of *E. laciniatum* (Cav.) Willd. Carter noted that in the Kuwait hinterland people collected and ate *E. cicutarium* (probably in fact *E. deserti*) raw (1917, 193–94). My own records show the name ***ragam*** commonly applied in much of our area to *E. deserti* and *E. laciniatum.* I never observed my consultants eating or collecting any of the various species of *Erodium* that are relatively common in the desert flora. Nor did they list them when

questioned about edible plants. In the more northern Arabian desert, however, at least in earlier times, *Erodium* was apparently treated as a salad herb eaten raw.

rghēlah, *Atriplex dimorphostegia* Kar. et Kir. (Chenopodiaceae) (fig. CD.91): Musil listed this fleshy-leaved annual among plants eaten raw by the Ruwalah Bedouins of northern Arabia (1928a, 95). It occurs in parts of our area and does have some characteristics of annuals eaten raw (such as smooth, fleshy leaves), but I have no record of its use there as a food.

ṣiffār, ṣifār, *Schimpera arabica* Hochst. et Steud. (Cruciferae) (fig. CD.300): I have seen Bedouin children gathering handfuls of the leaf rosettes of this yellow-flowered annual to nibble raw as a mustardy herb (fig. 3.3).

umm rwēs, identified by Musil as *Scabiosa palaestina* L. (Dipsacaceae, figs. CD.298, CD.299): Musil listed this plant among those annuals eaten raw by the Ruwalah Bedouins (1928a, 95). I have not found any reference to such use in more recent times.

4.3.4 Edible Fruits and Flowers

kurrēsh, ʻitr, kubbēsh, kabūsh, ʻantēr, *Glossonema varians* (Stocks) J. D. Hooker (Asclepiadaceae) (fig. CD.184): The numerous vernacular synonyms for this plant indicate its wide recognition and use, and its edible qualities are vouched for even by its synonymous scientific name, *G. edule* N. E. Br. The consumed parts of this smallish perennial herb are the young, tubercle-covered fruits and to a lesser extent the young leaves. It is used, as far as I know, only in the raw state. The fruits have specific names that vary among tribes: ***ʻitrī*** (Qaḥṭān), ***kabash*** (Āl Rāshid), and ***jarū*** (Banī Hājir). Even after being assured of its palatability, I tried eating this plant with some trepidation after eyeing the potent-looking latex that oozed from its wounds. But I found the very young fruits quite tasty and harmless, with a flavor somewhat like sweet cabbage. They become inedible with maturity because of their tougher texture and comose seeds.

markh, *Leptadenia pyrotechnica* (Forssk.) Decne. (Asclepiadaceae) (fig. CD.224): This large, virtually leafless shrub of our southern coastal areas, sometimes more than 3 m high, has edible flowers and young fruits that are together called ***maʻālīt*** by the Banī Hājir. A consultant of Āl

Rāshid (a speaker of non–Najdī Arabic) gave the names ***ʿuthrab*** (pl. ***ʿathārīb***) for the edible flower bud and ***ʿālūt*** (pl. ***ʿawālīt***) for the young fruit.

mṣaʿ, ghardag, *Nitraria retusa* (Forssk.) Aschers. (Zygophyllaceae) (figs. CD.245, CD.246): I found this stiff-branched shrub of saline soils at only one place in our study area—a coastal site near the Saudi Arabian border with Kuwait—and I have no record of its use there as an edible plant. It also occurs in the far northern desert, where Musil describes the Ruwalah's collection of its "dark-red ripened fruit," called ***ṭalʿ,*** which he says are very sweet but with a bitter aftertaste and which are also boiled into a thick syrup (1928a, 95). William Palgrave, passing through the Sharārāt country of northern Arabia in 1862, described the ***mṣaʿ*** fruit: "Its shrub attains two or three feet in height, woody and tangled, with small and pointed leaves of a lively green, and a little red starlike flower. This in June gives place to a berry much resembling in size, colour, and taste our own red currant, though inferior to it in flavour, while its sweetness predominates too much over its acidity. The Bedouins collect and greedily devour it, or, boiling it down with a little water, procure a sort of molasses, much esteemed by them, but by them alone" (1865, 1:30).

ʿōsaj, ʿōshaj, ʿōshaz, *Lycium shawii* Roem. et Schult., *L. depressum* Stocks (Solanaceae) (figs. CD.228–31): The two species of this large intricately and stiffly branched shrub look much alike; *L. shawii* is more common. The edible berries of the plant, well known to all Bedouins, are globose, red, and about 4 to 5 mm in diameter. The taste is sweetish, but the seeds are inconveniently large for the size of the edible portion. A Banī Hājir consultant gave me the name ***dōm*** for the berries. In early times, they were called *maṣaʿ* (Hamidullah 1973, 274), the name used today for *Nitraria*, which also has edible red fruits. Violet Dickson recorded that the berries were eaten by one "Flt. Lt. Stevenson [of the British Royal Air Force] when stranded for five days without food or water at Um Kasr [Umm Qasr in southern Iraq] in July 1941, and did him no harm" (1955, 62).

rāk, arāk, *Salvadora persica* L. (Salvadoraceae) (figs. CD.289, CD.290): There are only two stands of this large shrub in our study area, but it is well known among all tribes as the source of the root and stem pieces used to make toothbrushes (described in section 4.6). Bedouins from farther south, who range out of the southern and eastern Rubʿ al-Khālī into nearby areas where ***rāk*** grows more plentifully, eat the fruits of this plant,

said to be sweet. A Rāshidī consultant familiar with the practice used the synonymous names ***mard*** and ***mushg*** for these fruits.

sa'dān, *Neurada procumbens* L. (Rosaceae) (figs. CD.243, CD.244). I had no evidence from my consultants that this plant was edible, but I self-tested Violet Dickson's report that children in the Kuwait area ate the young fruits (1955, 67). I found that when very young the fruits are tender and not unpleasant to taste, if somewhat mucilaginous. They very soon become woody and inedible, however.

sidr, *Ziziphus spina-christi* (L.) Willd. (Rhamnaceae): This well-known tree is found in the stricter confines of the study area only in cultivation or on abandoned habitation sites. Tribes of the southern Rub' al-Khālī, however, sometimes range into parts of southern Arabia where the tree grows wild. Its fruit, a short-pedicelled ovoid or globular drupe 0.8 to 1.5 cm in diameter, is called ***nabag*** and is edible.

4.3.5 Seeds and Grains

samḥ, the fine seeds of the annual herbs *Mesembryanthemum forsskalei* Hochst. (fig. CD.237, CD.238), *M. nodiflorum* L. (fig. CD.239), and *Aizoon canariense* L. (fig. CD.52): Both genera are aizoaceous. ***Samḥ*** has been an important food among the Sharārāt, Ruwalah, and Shammar in northwestern Arabia, historically providing what is in effect a "poor man's grain" for those unable to afford the wheat or rice available only by purchase. The English traveler Charles Doughty, in his classic style, described his encounter with ***samḥ*** in the late spring of 1877 outside the southwestern fringe of the Great Nafūd sand desert:

> I saw often the *samhh* plant growing, but not abundantly; now a leafless green wort, a hand high, with fleshy stems and branches full of brine, like samphire. At each finger end is an eye, where the plant drying up in early summer, a grain is ripened. In the Sherarăt country, where the samhh grows more plentifully, their housewives and children gather in this wild harvest. The dry stalks are steeped in water, they beat out the seed with rods; and of this small grain their hareem grind flour for the daily mess. I had eaten of this wild-bread at Maan; it was black and bitter, but afterward I thought it sweet-meat, in the further desert of Arabia. The samhh porridge is good, and the taste "as camel milk": but

> the best is of the flour, kneaded with dates and a little *samn* [clarified butter], to be eaten raw: —a very pleasant and wholesome diet for travellers, who in many open passages durst not kindle fire. (1936, 1:357)

Another Englishman, William Palgrave, had passed through the Sharārāt country fifteen years earlier, in 1862. Palgrave's Arabian geography has often been questioned, but his description of ***samḥ*** is accurate and gives an indication of the importance of this plant in earlier times. He calls it "a main article of subsistence to the Bedouins of Northern Arabia" and describes both the plant and its product:

> Throughout this part of the desert grows a small herbaceous and tufted plant, with juicy stalks and a little ovate yellow-tinted leaf; the flowers are of a brighter yellow, with many stamens and pistils. When the blossoms fall off, there remains in place of each a four-leaved capsule about the size of an ordinary pea, and this, when ripe, opens to show a mass of minute reddish seeds, resembling grit in feel and appearance, but farinaceous in substance. The ripening season is in July, when old and young, men and women, all are out to collect the unsown and untoiled-for harvest. The capsules are gathered, the seed separated from them, and kept like a stock of flour for the ensuing year. These seeds, when wanted for use, are coarsely ground in a hand-mill, then mixed with water, and boiled into a substance which we now had before us. Its taste and quality were pretty well hit off by Salem, who described it, "not so good as wheat, and rather better than barley-meal." (1865, 1:29–30)

The name ***samḥ*** applies both to the seed product and the plants themselves, although a more specific name for the seeds is used in some contexts. An elder Shammarī consultant confirmed that the Sharārāt tribe is particularly known for its use of these seeds, which are treated much like wheat grain, being ground into flour and made into bread or cooked into a sort of porridge. It was still being collected in the 1960s, and I was brought a specimen of the seeds by one of my consultants, who had traveled to the far northwest for a home visit.

According to the same Shammarī elder, there are three varieties of ***samḥ,*** each from a different plant and each of different quality. The three ***samḥ*** plants are (1) ***ḥurr*** (whose name means "pure, true, genuine"), *Mesembryanthemum forsskalei*, which is the largest and best plant for ***samḥ,*** with

the largest pods, and which grows on the wide plain of al-Busayṭā’ around the southern end of Wādī as-Sirḥān and also near al-Jawf and in Wādī as-Sirḥān itself; (2) ***ḥamar wāgif*** (whose name means “standing red,” the ***g*** of the second component usually pronounced as the fronted affricate ***dz***), *Mesembryanthemum nodiflorum,* which is a smaller plant that tends to turn dark red when maturing under drying conditions and which grows in the Jabal Shammar district of Najd in Baq‘ā’ and near the village of al-Kahfah; and (3) ***da‘ā‘,*** which grows in the same areas as does ***ḥamar wāgif.*** Ruwalah and Shammarī consultants gave the name ***da‘ā‘*** to a fresh specimen of *Aizoon canariense,* saying it provided “***samḥ*** of poorer quality.” This information is somewhat at variance with that of Musil, who said the Ruwalah recognized only two kinds of ***samḥ,*** one called ***ḥurr*** or ***ḥamar wāgif*** (transliterations revised) and the other called ***da‘ā‘*** (1927, 464). He equates the first with *M. forsskalei* and the second with *M. nodiflorum.* It is not clear whether these differences reflect different tribal usages or incomplete data. It is in any case clear that *M. forsskalei* is the prime source of this edible seed. My record of *Aizoon canariense* as a third ***samḥ*** plant in Arabia does seem confirmed by evidence elsewhere: Dale Osborn found the seeds of that plant being used in Egypt’s Eastern Desert for cooked gruel under the names *hadaq, hudak,* and *samh* (1968, 175).

In Shammarī (and probably other northern) usage, the seed-bearing capsules of the ***samḥ*** plants go by the name ***ka‘bar,*** and the seeds themselves have the name ***sbīb.*** The collection process was described to me as follows: Arabs camp in the plain of al-Busayṭā’ during the hot season. The ***samḥ*** plants, growing in clumps, are beaten with sticks and iron rods to knock the capsules loose. Then the capsules are broken on the ground, and the whole lot scraped into a pile and carried off to a ***miṣwāl*** (pl. ***maṣāwīl***), a trough made of (or in) clay and lined with camel hide. Water is then poured on the pile, and the seeds sink while the empty capsules and other chaff floats off. Finally, the seeds are collected, dried, and put through a sieve to remove stones.

Musil noted that the ***samḥ*** plants “shoot out as late as March but only after the soil has been thoroughly soaked by the *ath-thrēyāwī* [transliteration revised; the Pleiades, or November] rain” (1927, 464). His description of the method of seed collection (1928a, 15–16) closely parallels my consultant’s account, and he also reported that the ***samḥ*** seeds may be kept “so that they may serve as an article of food in a poor season” (1928a, 16). It may thus be considered a famine food. Musil also described an interesting

northern dish called *bakīr* (transliteration revised), which is prepared from dates and ***samḥ*** seeds. The ***samḥ*** is roasted, ground, mixed with fresh dates, and kneaded into a paste. The ***samḥ*** flour, he says, absorbs all the juice of the dates, and the food keeps good for a year. "Its taste is insipid but recalls that of chocolate" (1928b, 6).

thmām, *Panicum turgidum* Forssk. (Gramineae) (fig. CD.8): Elder consultants reported that the grains of this important perennial fodder grass used to be collected and pan roasted for food during hard times. It has been used as a wild plant food in recent times in the western Sahara; J. T. Williams and R. M. Farias (1972) cite views that such use may be a prehistoric survival. In fact, I had speculated earlier that the people responsible for the many Neolithic habitation sites associated with prehistoric lake beds in the northern and western Rubʿ al-Khālī used the grain of wild ***thmām*** (see McClure 1984 for a description of the environments of these finds). I found numerous discoid grinding stones at these sites comparable to those described by Johannes Nicolaisen (1963, 235, 242) in use by the Tuareg of the central and southern Sahara. In the Sahara, according to Williams and Farias, the grains of *Panicum turgidum* are usually ground into flour, which is used to make porridge (1972, 15–16). Nicolaisen says that the Tuareg of the Ahaggar massif collect the grain of *Panicum turgidum* "by beating the ears of the grass with a stick." He adds that the seeds are not suitable for bread but are used for porridge and for eating raw after pounding in a mortar (1963, 175). The Tuareg of the Ayr region also use the seeds, collecting them by "rubbing the ears of the grass between the hands to allow the seeds to fall into a plaited bowl," to be used as porridge (Nicolaisen 1963, 180).

Experimenting with this plant, I found that the grains, which grow in open panicles, can be stripped quite easily by hand. My consultants' reference to "roasting" the grains suggests they might have been preserved by parching. The grain might thus have been held in store for famine times. I saw no evidence that ***thmām*** grains were used in the 1960s or later.

4.3.6 Gums and Other Exudates

ʿaḏris, ʿuḏris, *Convolvulus oxyphyllus* Boiss. subsp. *oxycladus* Rech. f. (Convolvulaceae) (fig. CD.127): Violet Dickson reported that "a gum comes out from the stem which children suck like chewing gum" (1955, 33). I am

not acquainted with this practice, and my eight readily available specimens of this pink-flowered, woolly-tomentose shrub do not show any sign of such an exudate. It may, however, be a seasonal phenomenon.

rimth, *Haloxylon salicornicum* (Moq.) Bge. (Chenopodiaceae) (figs. CD.195, CD.196): Musil said that the Ruwalah collected a sweet juice that flows out of the stems of this shrub in summer (1928a, 95). I have seen drops of such exudate on the stems of ***rimth*** and have a vague memory of one of my Āl Murrah friends nibbling at it. It did not, however, appear to be a significant plant food in the 1960s.

4.3.7 Flavorings and Food Additives

Asteriscus pygmaeus (DC.) Coss. et Dur. (Compositae) (fig. CD.77): Violet Dickson reported that Bedouins put this dwarfish, yellow-flowered annual into sacks of rice to "keep it sweet" (1955, 68). For this plant, she gave the vernacular name *burkat,* which I have not encountered.

b'ēthirān, *Artemisia judaica* L. (Compositae): According to Musil, the Shammar mixed dates with pieces of this aromatic plant, boiled the mixture until the juice evaporated, then dried and preserved it (1928b, 6).

A consultant of Banī Hājir pointed out that either of two plants was used as an additive in the preparation of ***igṭ,*** the Bedouin dried cheese cakes. The first was ***ḥummēḏ (ḥammāḏ, ḥambāḏ),*** *Rumex vesicarius* L. (Polygonaceae) (figs. CD.282–84), a strongly sour-tasting wild dock. The second was ***ribl*** or ***yanam,*** *Plantago boissieri* Hauskn. et Bornm. (Plantaginaceae) (figs. CD.261, CD.262). These plants presumably act as an aid in coagulating the milk curds. Carter reported that ***gurrēṣ*** (my transliteration, almost certainly the composite *Aaronsohnia factorovskyi* Warb. et Eig, although he labeled it "*Matricaria* sp.") was used for the same purpose, saying that the dried flowers were added to the boiling buttermilk in the ***igṭ***-making process (1917, 203). He also noted that ***barwag,*** *Asphodelus tenuifolius* Cav. (Liliaceae, figs. CD.75, CD.76), was used in the same way. ***Barwag*** is a weedy annual often found around campsites.

4.3.8 Truffles and Mushrooms

fag' (a plural form of the name, ***fag'ān,*** is also sometimes used), *Tirmania nivea* (Desf. ex Fr.) Trappe, *Tirmania pinoyi* (Maire) Malençon,

FIGURE 4.7. A desert truffle cracking the ground *(right of center).* Such signs may be obvious, as in this case, or very subtle. The earth may sometimes be pushed up into a hump.

Terfezia boudieri Chatin (figs. 4.7–4.10, CD.339, CD.340): Truffles are the ascocarps, or spore-bearing bodies, of an underground fungus. Those found in the desert differ from those used in European gourmet cookery (*Tuber* spp.); they are generally lighter in color, often of larger size, and of lesser flavor and odor (although they do have their own characteristic odor). The same species are found across the Saharo-Arabian region as far west as Morocco. ***Fag‘*** look externally much like potatoes, although they are of generally rounder shape rather than elongated. They range from pea size to grapefruit size. ***Fag‘*** are the Bedouin wild food par excellence. Their use has not declined and in fact has probably increased since widespread use of motor vehicles has made search and collection more efficient. Truffles are also well known and liked by the settled population of Arabia, at least those parts north of the Tropic, and it is not

FIGURE 4.8. A truffle excavated. This biscuit-shaped example would be considered to be of small to medium size.

uncommon for families from towns to drive out for a day or weekend outing to truffle hunt.

As is generally believed throughout Arabia (and as confirmed by my own experience), truffles are found only in years favored by relatively early rains in the ***wasm*** (autumn) period and that have a continuing good distribution of rainfall leading to February and March, when the truffles develop fully and can be collected. Such years are rather infrequent, so truffle collecting generally can be done only at intervals of several years. Some Bedouins say the early rains must occur as thunderstorms, that lightning is required, or even that truffles are "caused" by lightning striking the ground. Good truffle years thus coincide with those luxurious periods of spring herbage known to the Bedouins as ***rabīʿ*** and share in all the associations of good living, free-flowing milk, general abundance, and hospitality associated with that term. It is not unusual for a Bedouin finding an unusually big, early truffle to go to the nearest large town

FIGURE 4.9. Hunting truffles. Keen-eyed consultant ‘Alī ibn Sa‘īd of the Banī Hājir tribe *(right)* points out locations to be dug by his sons. The plant community is ***thmām*** grass-shrubland, with moderately grazed “shrublets” of *Panicum turgidum.* Southwest of Abū Ḥadrīyah, 27 February 1975.

and make a gift of it to the emir or chief government official. He can be assured of receiving a more generous return gift.

Also well known to all Bedouins is the association between the truffles and certain wild plants that act as truffle ground indicators. All these indicators are species of the genus *Helianthemum* (Cistaceae), known to the Bedouins under several names, the most common of which is ***ragrūg,*** but which also include ***umm as-swēgah, swēgah, jirrēd,*** and ***argā.*** Judging from my records, any or all of these names can be used for any of the following plants, all of which are considered truffle indicators: *Helianthemum ledifolium* (L.) Mill. (annual) (figs. CD.339, CD.340), *H. salicifolium* (L.) Mill. (annual), *H. kahiricum* Del. (perennial) (fig. CD.199), and *H. lippii* (L.) Dum.-Cours. (perennial) (figs. CD.200, CD.201). The annuals often grow only a few inches high, and

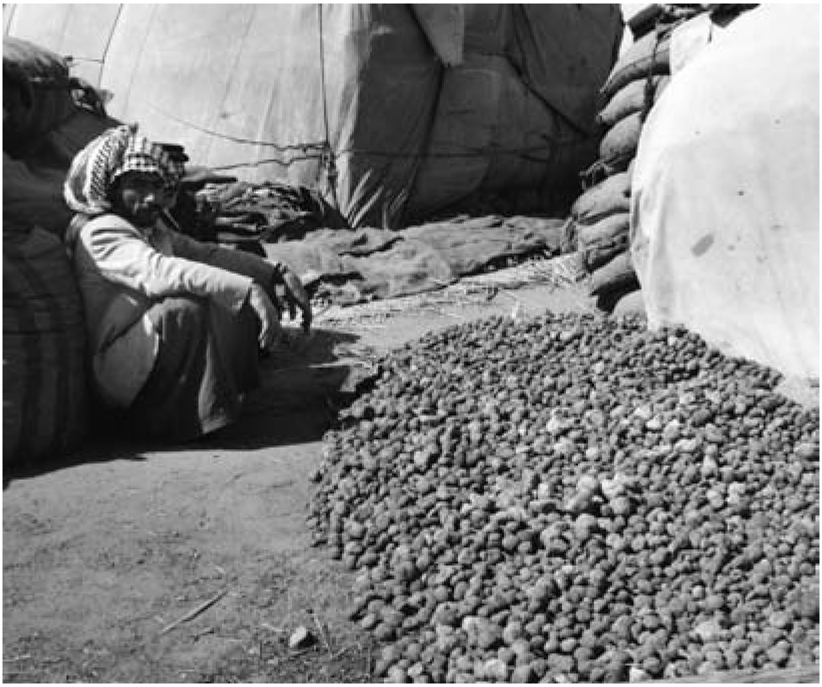

FIGURE 4.10. Desert truffles for sale in 1961 at an open market at Ḥafar al-Bāṭin (see fig. 1.2). Such scenes are found very rarely, only in years when rains are early, plentiful, and well timed.

the perennials are dwarf shrublets; all are easy to recognize by their grayish pubescence and revolute-margined elliptical leaves. There is a definite micorrhizal symbiotic relationship between truffles and plants of this genus (Bokhary 1987, 251), and the relationship appears to be obligate for the truffle, but not so for *Helianthemum.* Thus, truffles are found only where one sees *Helianthemum,* but *Helianthemum* can often be found without any associated truffles. One general area known for its truffle production is the dead-flat and virtually shrubless country known as al-Qarʻah (the Baldlands) up along the Trans-Arabian Pipeline in the northern part of the Eastern Province of Saudi Arabia. I collected specimens of three of the four *Helianthemum* species from the gritty soil there where truffles are found. Consultants say also that the combination of truffles and ***ragrūg*** is often found on basins in country dominated by

'arfaj, the composite shrublet *Rhanterium epapposum.* Truffles have been found to be associated with sandy soil (but in my experience not pure sand; a silt component is usually present) that may be gypsiferous or saline. The soil tends to be alkaline, with pH of 9.5 to 9.8 (Bokhary 1987, 252–53). Truffles appear on a given site over a period of (at least) years, and Bedouins who know these locations tend to keep them secret within the family.

Bedouins in our study area recognize four folk specifics of ***fag':***

az-zbēdī	whitish in color and the largest
al-khlāṣ	brown ("red")
al-jbēy	brownish ("red"), said often to contain sand
al-hbērī	small, pea size; eaten by birds

The first two kinds are considered the best eating. One consultant said on one occasion that the ***zbēdī*** was the best, on another that the ***khlāṣ*** was preferred. The name ***zbēdī*** comes from ***zibd,*** "butter," referring to its cream-white color, the color of fresh butter. The word ***khlāṣ*** means "choice, pure," and it is a name applied also to a premium variety of dates grown in the oases of eastern Saudi Arabia.

Nearly all Bedouins can recite four internally rhymed lines giving the names of these truffle folk specifics, and the piece may have a mnemonic function. In my study area, the verse generally takes the following form:

Az-zbēdi lil-wlēdī	The ***zbēdī*** for the little boy
al-jbēyah lil-bnēyah	The ***jbēyah*** for the little girl
al-khlāṣī ḥagg rāsī	The ***khlāṣī*** for myself [literally "for my head"]
al-hbērī liṭ-ṭuwērī	The ***hbērī*** for the little bird

Musil indicated that the Ruwalah of northern Arabia recognized three kinds of ***fag': al-kama, az-zbēdī,*** and ***al-khlāṣī*** (revised to my transliteration). They sorted them with the following rhyme: ***"Al-kmēyah l-umm al-bnēyah, az-zbēdī l-umm wlēdī, wal-khlāṣī l-rāsī"*** (***Al-kmēyah*** for the mother of the little girl; ***az-zbēdī*** for the mother of my little boy; and ***al-khlāṣī*** for myself) (1928a, 15). The first Ruwaylī name, ***al-kama,*** corresponds to the term usually used for truffles in classical Arabic, *al-kama'* (the term ***al-kmēyah*** given in the Ruwaylī rhyme is in the form of the diminutive singular). The name ***al-kama*** appears to correspond to the

variety called ***al-jbēy*** (or ***al-jbē',*** as pronounced by one Marrī consultant) among the more southern tribes.

A consultant of the Shammar tribe gave me the following folk specifics for truffles: ***az-zbēdī*** (which he said was white colored); ***al-jibā*** (of "medium red" color), ***al-ghlāṣī*** (reddish, heavy, and dense and said to grow in heavy silts), ***al-hōbar*** (small and eaten by birds), and ***al-blūkh.*** The last kind was said to be found only in the Syrian desert, including parts of the Ḥamād region of Saudi Arabia's far north. Its color was said to be ***ash/hab,*** or grayish.

The relationship between the folk specific names for truffles and the scientific species that have been identified is clear in part. The ***zbēdī*** corresponds to *Tirmania nivea* and possibly to *Tirmania pinoyi* as well. The latter is scientifically described as being very similar to *T. nivea* except in the microscopic characters of spore shape and size (Alsheikh and Trappe 1983, 88). The folk specific ***khlāṣ*** or ***khlāṣī*** corresponds to *Terfezia boudieri,* and the specimens studied by Mohamed Awameh and Abdelmagid Alsheikh (1980) were given that name. Violet Dickson also had ***khlāṣ*** specimens identified as *Terfezia* species at Kew. But it is not clear whether the folk specifics ***al-jbēy*** and ***al-hbērī*** are also scientific species or just size or form variants of the three species listed earlier. A. M. Alsheikh and J. M. Trappe refer to the apparent involvement of birds in the spore dispersal of "the small desert truffle, *Phaeangium lefebvrai* Pat." (1983, 88), but it is not clear from their context whether this example corresponds to our ***hbērī*** folk specific said to be small and eaten by birds.

Truffles often figure in the Bedouins' oral literature. Something may be described as ***abyaḏ faggā'ī*** (as white as a truffle), or a maiden's breast may be likened in verse to a ***zbēdī*** (truffle) "growing in an overflowing vale" (as in a Bedouin poem recorded by Musil [1928a, 322–23]). A Hājirī consultant gave me a riddle that begins with the regular introductory expression of the Bedouin riddle genre—***"ḥājīk"*** (literally "your wit," loosely "What is it that . . .").:

Ḥājīk mā bānyāt al-bēt wamazyan banīhin
sharābāt al-mā iblēyah ḥnājir

What are they that build a house, and pretty is their building,
And that are drinkers of water although they have no throats?

Answer: ***al-fag',*** truffles

The "building of a house" refers to the way truffles, as they grow and mature, crack the soil that lies over them (fig. 4.7) and sometimes push it up into a tentlike hump (fig. CD.339). It is only by these cracks and little mounds in the earth that truffles can be found. The best collector is the one who has the best eye for these ground surface disturbances, which range from the obvious to the most subtle. The "drinking of water" describes the truffles' growth as they absorb soil moisture from the earlier rains.

Truffles are prepared for eating in several ways: by simply boiling them in a pot by themselves; roasting them in the ashes of a fire; by adding them to a larger dish such as a stew or rice; or by slicing and frying them in ***samn*** (clarified butter) or other oil. I found the frying-in-butter approach by far the best to my Western taste, resulting in a flavor much like fried mushrooms. When served boiled ***fag'*** by a Bedouin family one time, I had to force myself to finish them to maintain politeness. Several consultants told me that truffles can also be dried in the sun, after which they are called ***shṭīb*** and will keep "for years" and taste "just like fresh" when later rehydrated. A tribesman of Banī Hājir who lived in town and had a freezer told me more recently that they may be kept frozen, and I have kept them successfully that way myself.

Use of motor vehicles by both Bedouins and settled people in Arabia has without doubt put increasing collection pressure on desert truffles. I do not, however, have any data indicating whether there might be a conservation problem with respect to this widely exploited wild resource. Work has reportedly been under way in some quarters in Saudi Arabia to devise techniques for the artificial culture of desert truffles on a commercial scale. Alsheikh and Trappe mention such a program in Kuwait, noting that both spores and cultured mycelium have been used successfully there as mycorrhizal inoculum on species of *Helianthemum* (1983, 89).

Capped mushrooms (fig. CD.336 shows one of several species I have seen), so far unidentified by me scientifically, are called ***ifṭarrah*** or ***fuṭūr*** and apparently ***hōbar*** in northern Arabia. Musil reported that the Ruwalah collected and ate mushrooms called ***hōbar*** (the same name given me by a Shammarī for the smallest kind of truffle) (1928a, 15). A Hājirī elder gave the name ***ifṭarrah,*** a form related linguistically to the name "***ftur***" (general Arabic *fuṭūr*), which Violet Dickson recorded for mushrooms in Kuwait (1955, 103). I did not find evidence of consumption of mushrooms in our

more southern study area; in fact, capped mushrooms are rarely seen in those parts.

The white, club-shaped (noncapped) mushroom or toadstool known as ***'arjūn,*** *Podaxis pistillaris* (figs. CD.337, CD.338), is by far the most common emergent fungus seen in the desert. It may be found in extremely arid habitats, growing during brief rains then remaining standing dried for many months. I found it even in the middle of the Rub' al-Khālī. Violet Dickson reported that Bedouin children in Kuwait collected them, baked them in hot ashes, then ate them peeled (1955, 104). One consultant in my study area told me that these mushrooms were not eaten here. In any case, they obviously must be collected when quite young because they become pithy or woody with maturity and release unappetizing black, powdery spores.

The English explorer Wilfred Thesiger, traveling the sand country between Abu Dhabi and al-Buraymī (in the present United Arab Emirates, eastern Arabia) noted that in the spring of 1948 he ate "toadstools" roasted by his guide and described them as "creamy and delicious" (1959, 249). These "toadstools" were almost certainly ***'arjūn,*** *Podaxis,* because Thesiger elsewhere referred to "edible toadstools (*Podaxon*)" in the same geographical area (1950–51, 164).

4.4 Medicinal Uses of Plants

My consultants pointed out a number of local desert plants said to have medicinal functions, but my impression was that they actually made little use of them, even at the beginning of my data collection in the early 1960s when modern medical services were still largely unavailable to the rural population. The Bedouins seemed rather to use mainly the same herbal remedies that villagers did. These remedies consisted largely of the traditional materia medica long utilized in the Persian Gulf region, comprising many plant drugs (as well as nonplant substances) imported from neighboring lands such as Iran and India and only a limited number of truly local plant species. I remember one occasion when a Marrī acquaintance invited me to view the medicines that his wife used. She pointed out in her chest only ***ḥabbah sōdā*** (literally "black seed," seeds of *Nigella sativa* L.), ***murr*** (myrrh, oleoresin of *Commiphora myrrha* Nees), and ***ḥaltīt*** (asafetida, the pungent resin of *Ferula assa-foetida* L.), all commonly found in village herbalist shops and imported, respectively,

from the Mediterranean region, Somalia or southern Arabia, and Iran, where they have long been produced as medicinals. *Nigella* is also grown in parts of Arabia. Robert Lebling and Donna Pepperdine (2006) provide a useful survey of such general regional medicinals of eastern Arabia. Some of these medicines are not of plant origin, and they seem to be used primarily by village and townspeople, but Bedouins, as indicated earlier, do use (or have used, historically) at least some of the market botanicals.

I gathered a collection of such medicinals in herbalists' shops in al-Qaṭīf and ad-Dammām, and appendix B lists the plant products I was able to identify. In the main, these products were similar to those useful plants and drugs that David Hooper (1937) collected in Iran and Iraq and identified and described. They are known to the shopkeepers and labeled (if at all) only by their Arabic names. The proprietors of herbalist shops sometimes seemed to be purposely vague or secretive about the uses made of the herbs they handled when I talked to them, and some of my specimens lack notes on local indications.

The following list comprises Najdī Arabic folk generics said to have medicinal uses. All of them are part of the native eastern Arabian flora and are known to have been used by Bedouins. Some of these plants appear in village herb shops, but I have not heard of Bedouins in the study area collecting them for sale. I suspect, rather, that the town herb specialists themselves collect their local materials or acquire them from other dealers or relatives. Many shopkeepers in eastern Arabia have family tribal connections; quite a few Dawāsir are settled in ad-Dammām and al-Khubar, and I noted that several items in herbalist shops were said to have been brought in from Wādī ad-Dawāsir, the heartland of that tribe. I have arranged the list by what appears to be the plants' primary use, although some have multiple applications.

4.4.1 Arthritic Complaints

ḥarmal, *Rhazya stricta* Decne. (Apocynaceae) (figs. CD.276, CD.277): The leaves of this shrubby perennial, according to some elder consultants, are smoked in a tobacco pipe and inhaled as a remedy for arthritis. Others said that a tea made from the leaves is "good for the liver" and that it is also applied to boils and wounds. According to Shahina Ghazanfar, *Rhazya* "has been one of the chief medicinal plants in Arabia." She notes

that it has been used in southwestern Pakistan to treat skin eruptions and boils and as a febrifuge as well as in Oman to treat chest pains (by smoke inhalation) and externally for skin rash and as eye drops (1994, 26–27). According to Anthony Miller and Miranda Morris, an infusion from the leaves of *Rhazya* was drunk in southern Oman as a febrifuge and to relieve stomach pains (1988, 34). Jaber Mossa, Mohammed Al-Yahya, and Ibrahim Al-Meshal cite reports of the isolation of more than fifty indole alkaloids from this plant and of antimicrobial activity in extracts (1987, 212). The Arabic name ***ḥarmal*** is also applied, mainly in other parts of the Arab world, to the zygophyllaceous plant *Peganum harmala* L., also an important medicinal but rarely seen growing in the study area.

shīḥ, *Artemisia sieberi* Besser (Compositae, in literature as *A. herba-alba* Asso) (fig. CD.74): This ascending, strongly lemony-sweet aromatic shrublet is found on silty floors of rocky country in our northern plains and wadis. Bedouins report its use as a medicinal for rather vague indications by inhaling its smoke or by drinking a water infusion. Lebling and Pepperdine record its use (as a tea) for diabetes in Saudi Arabia and Bahrain and with lemon for stomach ache and indigestion in northern Saudi Arabia (2006, 149).

sakhbar, idhkhir, khṣāb, ḥamrā, *Cymbopogon commutatus* (Steud.) Stapf. (Gramineae) (figs. CD.134, CD.135): This perennial grass of rocky wadi channels is easily recognizable by the distinct, sweet-lemony odor of its crushed foliage. It is a close relative of several other species of *Cymbopogon* exploited in tropical countries as a source of aromatic oil (lemon grass oil) and perfume essences, including *C. flexuosus* Stapf., *C. nardus* (L.) Rendle, and *C. schoenanthus* Spreng. (Uphof 1968, 67–168). It may be used in Arabia primarily for its aromatic qualities, but I found it for sale in an herbalist's shop in ad-Dammām, where it was said to be used medicinally by inhalation of its smoke. It is placed provisionally in the "arthritic complaint" category on the basis of its use by smoke inhalation, a route for rheumatism remedies or for lung disease. I have no record of its specific indications.

4.4.2 Cold Remedies

ṭagṭag, a kind of mushroom (not identified): Musil says that these mushrooms "grow under the sand" (but are not truffles) and are not edible, but

that the Ruwalah Bedouins of northern Arabia used them as a remedy for colds (1927, 254). They were also dried and smoked in a pipe as a treatment for rheumatism.

4.4.3 Emetics

'iḏat al-hāyish, *Euphorbia retusa* Forssk. (Euphorbiaceae) (figs. CD.172, CD.173): According to an elder consultant of the Qaḥṭān tribe, the milky sap of this plant is mixed with water and drunk as an emetic.

4.4.4 Eye Conditions

jalwah, *Atractylis flava* Desf. (Compositae): According to a Qaḥṭānī tribesman, the stem of this plant is peeled, and the inner tissue is applied directly to the eye to cure eye ailments. He said it creates a burning sensation in the eye and makes it red "but is very good for it."

fag', *Tirmania* spp. (fig. CD.340): Alsheikh and Trappe report that Bedouins in Kuwait used desert truffles, ***fag',*** of the genus *Tirmania* (known to the Bedouins as the ***ẓbēdī*** folk specific), in some unspecified way to treat eye diseases. My consultants did not mention medicinal uses of truffles.

4.4.5 Women's Conditions

kaftah, kaff maryam, birkān, barukān, jmē' fāṭmah, kaff al-'adhrā, kafn, gfē'ah, gnēfidhah, *Anastatica hierochuntica* L. (Cruciferae) (figs. 4.11, CD.63–65): This annual is well known by Bedouins and townspeople throughout Arabia for its use as an easer of childbirth when given in the form of a tea or used as a charm. The plant is inconspicuous when green, extending its radial stems horizontally on the ground. When it dies and dries, its somewhat woody stems curl inward, forming a characteristic ball usually 4 to 7 cm in diameter (fig. 4.11) that is likened to the clutched fingers of the Virgin Mary (recognized in Islam as well as in Christianity) in pain at childbed, a symbolism that obviously plays a role in its reputed medicinal effects. Several of its vernacular names mean "Mary's hand" or "the Virgin's hand." The plant is widely distributed in the study area and is often collected and sold in herbalists' shops for use in towns.

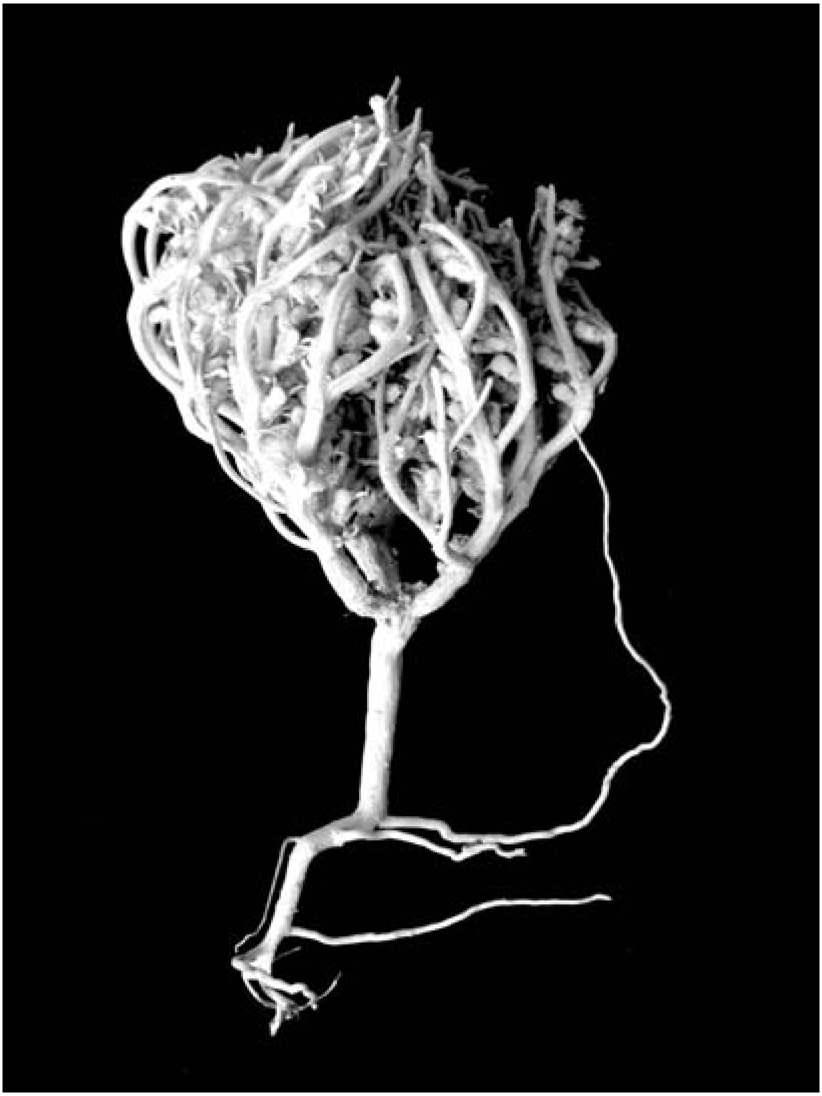

FIGURE 4.11. A dried ***kaftah*** plant, *Anastatica hierochuntica*. Overall length: 11 cm. The clasped branches expand and open when placed in water.

'abal, arṭā, *Calligonum comosum* L'Hér. (Polygonaceae) (figs. CD.99–101): I found Bedouin women in the Thursday market at al-Hufūf selling fine twigs of this common duneland shrub for use; mixed with milk, they said, it serves as a tonic "for women." It was sold both in the form of twigs and as already pounded to a fine powder, ready for use. I also found the twigs for sale in an herbalist's shop in Dammam. This plant may also have antidiarrheal applications (described in section 4.3). Lebling and Pepperdine cast more light on its employment by womenfolk, noting its use with pomegranate rind in water as a postpartum wash (2006, 19). They mention also its use in water to treat skin ailments in Bahrain and its addition to milk as a treatment against flatulence.

4.4.6 Fevers

ja'dah, *Teucrium polium* L. (Labiatae) (figs. CD.321, CD.322): All Bedouins know this sweetly aromatic perennial of rocky terrain for its use (at least in former times) as a remedy for fevers, including malaria. A Qaḥṭānī Bedouin from central Arabia told me that the plant is used by putting it into the hollow shank bone of a sheep and smoking it like tobacco. According to a Ruwalah tribesman, it is made into a tea. Violet Dickson cited reports of its former use in Europe and India (1955, 89–92). J. C. Uphof says that a liquid extract of the plant was used in India for the treatment of fungoid diseases and abscesses (1968, 517). Ghazanfar notes that eight diterpenoids have been isolated from the plant, that the content of essential oils varies from 0.05 to 0.09 percent, and that a sapogenin has also been identified (1994, 126, 128).

gēṣūm, *Achillea fragrantissima* (Forssk.) Sch. Bip. (Compositae): This extremely fragrant-foliaged perennial of silt bottoms in the northern part of the study area is said to be used, probably in the form of a tea, for fevers. I found it also in town herbalist shops sold for that purpose.

4.4.7 Kidney Ailments

'āgūl, *Alhagi maurorum* Medik. (Leguminosae) (fig. CD.54): This shrublet is seldom found in the desert but is sometimes seen on disturbed ground around the margins of cultivated areas. Its roots are said to be used in making a tea for treating kidney or liver ailments.

4.4.8 Laxatives

sharī, ḥanḏal, *Citrullus colocynthis* (L.) Schrad. (Cucurbitaceae) (fig. CD.122): This plant is widely known among Bedouins and villagers for its laxative qualities. A few seeds are said to be an effective dose. According to one consultant who asked me to give him a modern laxative, ***sharī*** is effective (***"yimashshā -l-baṭn,"*** literally "it makes the belly walk, move") but can cause painful cramping.

shajarat ad-dābb, 'ishrig, *Cassia italica* (Mill.) F. W. Andr. (Leguminosae) (figs. CD.111, CD.112): An elder of Qaḥṭān said that this plant is sometimes used as a strong purgative, "stronger than ***sharī*** [*Citrullus colocynthis*]." He added that livestock avoid the plant because they do not like its taste. Other consultants considered it dangerously poisonous to grazing camels.

grēṭā, *Plantago ovata* Forssk. (Plantaginaceae) (fig. CD.264): According to Carter, Arabs have used the seeds as a laxative (1917, 201).

'ushar, 'ishar, *Calotropis procera* R. Br. (Asclepiadaceae) (fig. CD.106): This erect, glaucous shrub, woody below, sometimes assumes treelike forms up to 5 m high. The foliage bleeds copious milky latex at the slightest wound. It is often considered poisonous, but available evidence from experiments on small mammals suggest that the toxicity of the raw latex may be somewhat exaggerated (Verdcourt and Trump 1969). Bark extracts, however, are reportedly used in some tropical countries in the preparation of arrow poisons. Various toxic alkaloids have been isolated from the plant, and a powerful cardiac poison, gigantin, has been extracted from a related species, *P. gigantea,* of India (UNESCO 1960, 25). Mossa, Al-Yahya, and Al-Meshal state that *Calotropis procera* contains a bitter principle, calotropin, which is a cardiac poison of the digitalis type. They note that the latex is purgative and caustic and is used topically as a counterirritant (1987, 214). Bedouin tradition in eastern Arabia does hold it to be poisonous, and livestock are said to avoid it. There is good evidence for this avoidance in the plant's persistence on ruderal sites around villages and towns where household goats and sheep would otherwise be expected to browse it to destruction. As I have reported elsewhere, "Small doses of the latex are sometimes used medicinally by Bedouins, although its specific indications are usually rather vague. An elder of the Bani Hajir tribe told the author that a safe but effective dose can be

obtained by scooping out the seeds and pulp from a halved ripe follicle and drinking a full measure of sheep, goat or camel milk from the resulting hollow, cuplike, still-green skin. Enough of the active principle is said to be absorbed from the fruit wall to be effective, and not enough of the latex will be consumed to pose any danger" (Mandaville 1990, 237). The object in such use was probably a purgative effect. Miller and Morris report use of the latex in southern Arabia to treat skin ailments (1988, 42). Ghazanfar indicates its use in Oman to relieve pain by the application of heated leaves with oil (1994, 31).

4.4.9 Skin Afflictions and Wounds

'ifēnah, *Cleome amblyocarpa* Barr. et. Murb. (Capparaceae) (fig. CD.123): Musil (1927) reports use of this plant among the Ruwalah of northern Arabia as a water infusion for application to wounds to prevent inflammation.

basbās, *Anisosciadium lanatum* Boiss. (Umbelliferae) (figs. CD.66, CD.67): This plant is used for skin sores and boils, probably as a water extract.

4.4.10 Snakebite and Scorpion Stings

ramrām, *Heliotropium ramosissimum* (Lehm.) DC., *H. bacciferum* Forssk. (Boraginaceae) (figs. CD.203, CD.204): My consultants confirmed reports that ***ramrām,*** comprising these two very similar species of heliotrope—both low, somewhat shrubby perennials with rough foliage—has long been used for the treatment of snakebite in Arabia. H.R.P. Dickson reported from Kuwait the desert folklore that the ***waral*** (the monitor lizard, *Varanus*) rolls in the plant's foliage and eats its leaves as an antidote to snake venom (1951, 467). Human snakebite victims were given tea from the leaves of ***ramrām,*** and a leaf poultice was tied to the wound. By far the most common species of venomous snake in eastern Arabia is the sand viper, *Cerastes cerastes,* and adult victims usually recover from bites without treatment. Dickson also pointed to use of this plant as an infusion or paste to treat mouth sores (1951, 160). A closely related heliotrope of Dhufar, in southern Arabia *(H. fartakense),* also called *ramrām,* is reportedly used there not only for snakebite but to treat skin sores, as an antipruritic, and for colic (Miller and Morris 1988, 74). One of my consultants from

northern Arabia attributed lizard-immunizing power like that of ***ramrām*** to a quite different plant, ***janbah,*** *Fagonia bruguieri* DC. (Zygophyllaceae) (fig. CD.174), which suggests the possibility of a similar use of the latter for snakebite.

msēkah, zgēgah, frēthah, zifrah, *Haplophyllum turberculatum* (Forssk.) A. Juss. (Rutaceae) (figs. CD.197, CD.198): This strongly and unpleasantly odiferous perennial was used, according to Violet Dickson (1955, 48–49), as a remedy for scorpion stings. The harvested plant is put into a pocket or bag to dry, then pounded up, mixed with a little hot water, and bound onto the site of the sting. Ghazanfar reports its use in Oman as a water extract to treat painful joints and in a compound suppository given to mothers postpartum to strengthen the back muscles (1994, 188). She also notes its use as a sedative. Miller and Morris indicate its use in southern Arabia to treat epilepsy and hysteria as well as gout (1988, 248).

4.4.11 Stomach Ailments

bābūnaj, *Matricaria aurea* (Loefl.) Sch.-Bip. (Compositae): This fragrant annual, a close relative of European chamomile (*Matricaria chamomilla* L.), is found on inland silt basins of our north-central area. It is known to both Bedouins and villagers, who use its flowers to make a tea for digestive ailments and as a general tonic.

4.4.12 Tonics

ṭarthūth, *Cynomorium coccineum* L. (Cynomoriaceae) (figs. CD.136–39): Bedouin elders of the Dhahran area said that villagers of al-Qaṭīf oasis used to collect donkey loads of this plant to bring in for sale to be eaten as a spring tonic (see section 4.3). The crimson pigment of the epidermis was also used as a dyestuff.

4.4.13 Toothache

karrāth, kirrēth, *Allium sphaerocephalum* L. (Liliaceae) (fig. CD.56): According to a Banī Hājir consultant, the ***zibrij,*** or spherical inflorescence, of this coarse, wild onion is used to treat toothache by placing it on a heated knife blade and inhaling the smoke into the mouth.

4.4.14 Insect Repellents

ja'dah, *Teucrium polium* L. (Labiatae) (figs. CD.321, CD.322): One use for this fragrant medicinal plant back in the day when intertribal raiding and warfare prevailed in Arabia was for the preservation of the leather parts of body armor. Commonly used Bedouin armor, at least in northern and central Arabia, included helmets and chain mail that often had leather and cloth backing or straps, and it was the custom to store such implements in leather bags with dried ***ja'dah*** to prevent insect damage or other deterioration of the leather parts. It thus appears to have insect-repellent properties. Musil recounted, from Ruwalah sources in northern Arabia, the story of how some Bedouin camp defenders hiding in ambush were given away by the sweet ***ja'dah*** odor of their recently donned armor (1928a, 53–54). Some of their enemy approaching from downwind caught the scent, realized its significance, and were able to escape. Those who disregarded the aromatic warning were massacred. I have a large jar of dried ***ja'dah*** flower tops that I collected some twenty-five years ago, and they still give off the plant's sweet characteristic odor.

4.4.15 Psychotropic Plants

There seem to be very few wild plants of narcotic or psychotropic reputation in our study area. A Shammarī Bedouin told me, however, of a plant called ***harj,*** "a low shrublet with leaves like tobacco," said to grow in the area of Sakākah in northern Arabia and reported a hallucinogen. He said that "a man who ate some leaves about fifteen years ago [i.e., around 1951] became incoherent and talked like a crazy man. A woman who ate some ran around like a locust, riding an imaginary donkey, and shouting that so-and-so had had sex with her." One would suspect a Solanaceous plant such as *Withania, Datura, Solanum,* or *Hyoscyamus.* The Arabic name, ***harj,*** is associated with a root meaning "confusion, disorder." Hobbs reports the collection of *Hyoscyamus boveanus,* a henbane called *sēkarān,* "drunk weed," for sale as an intoxicant by the Ma'zah Bedouins of northeastern Egypt (1989, 40). I have never heard such qualities attributed to our small annual *Hyoscyamus pusillus* (figs. CD.213, CD.214), but Mossa, Al-Yahya, and Al-Meshal describe *Hyoscyamus muticus* L., with the Arabic name *as-sakrān* (drunk weed), as a plant of southern Hijaz and Najd

that is sometimes used as an intoxicant (1987, 252–53). It seems most probable that this plant is the ***harj*** my consultant described.

This Shammarī account recalls William Palgrave's story about his encounter with a hallucinogenic plant during his travel in the fall of 1862 in the central Arabian region of al-Qaṣīm. Its seeds, he said, "when pounded and administered in a small dose, produce effects much like those ascribed to Sir Humphrey Davy's laughing gas; the patient dances, sings, and performs a thousand extravagances, till after an hour of great excitement to himself and amusement to the bystanders, he falls asleep, and on awakening has lost all memory of what he did or said while under the influence of the drug" (1865, 1:254–55). The British explorer St. John Philby tried without success to verify the story when he visited the same area in 1918 (1928, 281).

4.4.16 Veterinary Medicinals

As might be expected in a pastoral society, plant remedies are sometimes used to treat livestock ailments. The following folk generics were reported useful in traditional veterinary medicine:

makar (Āl Murrah), ***la'la'ah*** (Āl Rāshid, southern, non–Najdī Arabic), ***rgēyigah*** (Shammar), *Polycarpaea repens* (Forssk.) Aschers. et Schweinf. (Caryophyllaceae) (figs. CD.265, CD.266): This small-leaved prostrate perennial of sand terrain has been used to treat sarcoptic mange, ***jarab,*** on camels, which is the most frequent and troublesome ailment that animal suffers. Before lindane and other modern arachnicides became available in Arabia, camels with mange were treated with lime, arsenic, and sulfur in a lengthy procedure that a Banī Hājir elder described to me as follows. First day: mix ***nūrah*** (quicklime) with ***samn*** (liquid clarified butter) and rub all over the camel's body to remove hair. Second day: leave lime mixture on the animal. Third day: scrape off the hair with the lime and rub down the skin with a mixture of ***samn, kibrīt*** (sulfur), and ***zirnīkh*** (yellow arsenic, arsenic trisulfide—the sulfur and arsenic purchased in village markets). Hooper described arsenic trisulfide, or orpiment, as sold in Middle East bazaars and obtained from the Hayana Mountains of Iran (1937, 190). Next, pour a mixture of pounded sulfur and water (or ***samn***) down the camel's upheld nose. Fourth day: leave the mixture on to work. Repeat these procedures once or twice, leaving a day or two between

treatments. After ten to fourteen days, wash down the camel with saltwater or seawater and rub in ***samn. Makar*** was used mixed with arsenic in this procedure or simply mixed with arsenic and applied. According to Āl Murrah consultants, ***makar*** can also be used alone, either after burning in the form of ash or as crushed leaves. Violet Dickson's report that the leguminous annual *Lotus garcinii* DC. was called *makkar* and used to treat camel mange may have been based on a plant-identification error or a different northern usage (1955, 61).

'alandā, *Ephedra alata* Decne. (Ephedraceae) (figs. CD.160, CD.161): A consultant of Āl Murrah said this shrub was used to treat sarcoptic mange on camels in the same way that ***ṭarfā*** (*Tamarix* spp.) is used: by burning the shrub to ashes and then rubbing the ashes into the animal's skin.

ṭarfā, *Tamarix arabica* Bge., *T. aucheriana* (Decne.) Baum, *T. macrocarpa* (Ehrenb.) Bge., *T. mannifera* (Ehrenb.) Bge., *T. ramosissima* Ledeb. (Tamaricaceae) (fig. CD.318): Tamarisk was used to treat sarcoptic mange on camels by burning the wood "all night," then rubbing the ashes into the animals' diseased skin.

According to an elder Qaḥṭānī, when camels graze cruciferous herbs that are hot to the taste (examples given were ***ṣiffār,*** *Schimpera arabica* Hochst. et Steud [fig. CD.300], and ***khzāmā,*** *Horwoodia dicksoniae* Turrill [figs. CD.210–12]), these plants bring what he called ***jarab al-kirsh,*** "mange of the rumen," to the surface of the skin, where it can be treated more easily. Camels were said to graze on such plants mainly at night. I do not have any evidence that camels were purposely induced to eat these plants.

murr, *Commiphora myrrha* Nees. (Burseraceae): This oleogum resin, myrrh, is not native to our study area but is a commonly used import from the Somali coast of Africa or from southern Arabia. According to a Banī Hājirī consultant, a serious lung disease of camels called ***nihāz*** is treated by giving the animal water containing powered myrrh. At the same time, the camel is made to inhale smoke from burning camel dung.

thmām, *Panicum turgidum* Forssk. (Gramineae) (fig. CD.8): A Banī Hājir consultant described to me how the roots of this shrubby perennial grass, an important grazing plant, are used as a remedy for inflammation of the eye in sheep and goats. The herdsman thoroughly chews the roots and then spits the mixture of plant juice and saliva into the animal's eye, which is held open with the fingers.

ʻushar, *Calotropis procera* R. Br. (Asclepiadaceae) (fig. CD.106): A Qaḥṭānī elder said that this plant's somewhat caustic milky sap was used to treat camel galls and wounds.

shīḥ, *Artemisia sieberi* Besser (in literature as *A. herba-alba* Asso) (Compositae) (fig. CD.74): Musil reported its use by the Ruwalah Bedouins in northern Arabia as a smoke inhalant to cure glanders in horses and to treat "bewitched" animals (1928a, 383, 408).

4.5 Tanning and Dyestuffs

During my data collection, I did not come across much detailed information about plant uses for tanning and dyeing. This was probably a result of my lack of female consultants as well as of the fact that even by the 1960s commercial chemical products had largely supplanted traditional plant materials for these purposes. Several of my consultants said that ***ʻabal*** or (in the north) ***arṭā,*** *Calligonum comosum* L'Hér. (but for tribes of the Rubʻ al-Khālī *Calligonum crinitum* Boiss. subsp. *arabicum*) Sosk. (Polygonaceae) (figs. CD.99–104), was used in tanning, but they didn't describe the method of use. I personally had found that chewing on twigs of this shrub gave a strongly astringent taste, as of tannins. Musil provided some insight into its probable use when describing the tanning of camel hides by women of the Ruwalah early in the twentieth century (1928a, 70). They took half a camel hide and treated it first by rubbing in salt and wheat dough. After curing for five days rolled in the shade, the hide is unrolled, and the hair and any remaining flesh are scraped off. The women then "lay it in a tanning mixture of *arṭā* [*Calligonum comosum*] or *najīb* roots." There is no doubt about the identity of the first material, ***arṭā.*** Musil said it was collected by the women themselves, whereas the second was purchased. The ***najīb*** may have been an *Acacia* product, possibly bark (despite Musil's reference to "roots"). The basic meaning of the word *najab* is "bark," and Hobbs found the name *najub* used for *Acacia* bark among Bedouins in eastern Egypt who a few generations earlier had migrated from Arabia (1989, 52). *Acacia etbaica* Schweinf. is a possible source species because it is called ***garaḏ*** today, and classical Arabic sources refer to *qaraẓ* as an important tanning tree. The tree is probably not found in the usual migration range of the Ruwalah, so the bark would have been purchased in town markets. Finally, Musil continued, the leather was

finished for use as large water bags by rubbing with camel bone marrow or camel fat, ***widak.***

The English explorer St. John Philby found during his crossing of the Rub‘ al-Khālī in 1932 man-made, circular depressions in gypsum rock, 3 feet in diameter and 4 inches deep, which he says his guides described as the dye pits used by Bedouin women for leather goods, the “dye” coming “from the juicy shoots of the *Abal* bush [*Calligonum crinitum* subsp. *arabicum*], pounded on sheets of leather laid over the pit, until they yield their tannin” (1933, 227). It seems much more likely that the use here was for tanning rather than for dyeing, although I had a consultant’s report of ***‘abal*** used also for dyeing (described later).

An elder Āl Murrah consultant told me that ***ḥarmal,*** *Rhazya stricta* Decne. (Apocynaceae) (figs. CD.276, CD.277), presumably the leaves, was used to tan hides. This shrub, considered noxious to livestock, also has medicinal uses (section 4.4.1). Another plant used for treating hides was, according to an elder of Banī Hājir, ***‘ādhir,*** *Artemisia monosperma* Del. (Compositae). The leaves of this somewhat aromatic, densely leaved perennial of deep sand terrain apparently were pounded up and put on skins to cure them. It is not entirely clear whether this use was for the basic tanning operation or for some subsequent special curing step. Musil reported that the Ruwalah used ***lwēzah,*** *Prunus arabicus* Oliv. (Rosaceae), for the tanning of hides (1927, 229). I have collected specimens of this wild almond shrub in northern Arabia on the banks of Wādī ‘Ar‘ar, in the Iraq border region of Saudi Arabia. Its distribution does not extend into the study area proper.

My consultants told me that the twining, lactiferous shrub ***ghalgah,*** *Pergularia tomentosa* L. (Asclepiadaceae) (fig. CD.255), was used in earlier times for the removal of hair from hides preparatory to tanning. They did not have a clear idea of how it was used but attributed the depilatory activity to the plant’s milky sap. Nicolaisen describes how the Tuareg use the same plant in North Africa for dehairing hides for tanning: a bundle of the plants is dipped in hot water and rubbed over the inner side of the hide, which is spread out over rock or other firm support. Within a day, the hair loosens and can be plucked out with the fingers (1963, 275).

With respect to dyestuffs, I found good evidence of fairly recent use of the root parasite ***ṭarthūth,*** *Cynomorium coccineum* L. (Cynomoriaceae) (figs. CD.136–39), for the dyeing of cloth. A Bedouin elder said that the

crimson pigment on the epidermis of this plant stains fast and was used by Bedouin women of the Manāṣīr tribe (of southeastern Arabia, including parts of the Rubʿ al-Khālī) to dye clothing the dark red color called ***damī,*** "blood colored."

Violet Dickson stated that Bedouins (or townsfolk) in Kuwait made a yellow dye from ***ʻarjūn,*** the toadstool *Podaxis pistillaris* (figs. CD.337, CD.338), whose upper part forms a vertical club rather than a cap. This snow white fungus is found virtually everywhere in Arabia. This use fits Doughty's account of finding, during his north Arabian travels of 1876–78, "certain tall white toadstools; some of our fellowship gathered them, and these, being boiled with alum in the urine of camels that had fed of the bush el-humth, yield they told me the gay scarlet dye of the Beduin wool-wives" (1936, 1:402). The color described fits the dye from *Cynomorium,* indicated in the previous paragraph (which also grows in northern Arabia), but his eye witnessing of "tall white toadstools" can hardly be doubted. The use of what Doughty calls *el-humth,* or ***ḥamḍ*** here, is of special interest. The name applies not to any individual species of plant, but rather to that group of chenopodiaceous perennials known to play a special role in the camel's nutrition through their content of salt and other minerals (sections 4.1 and 5.3). The excretion of such minerals in the camel urine presumably can play a mordant (or pH-raising) role in the dyeing process.

Some other plant sources of coloring matter include:

tannūm, *Chrozophora oblongifolia* (Del.) A. Juss. ex Spreng. (Euphorbiaceae) (fig. CD.119): This plant is traditionally associated with the making of writing ink in Arabia, and a resident of Riyadh, in central Arabia, told me that it was used for this purpose. He said that the capsules were "cooked" in its preparation. Villagers in Najd told me similar stories. I have no evidence that Bedouins in the study area used it this way (or for any other staining purpose), although the plant occurs there, and many of them knew that the plant contained a dark stain of some kind. I found that the juice from this plant's capsules, apparently upon oxidation, frequently left strong blue-black or reddish stains on herbarium dryers. Another species of *Chrozophora, C. tinctoria* (L.) Raf., which is the tournsole dye plant of southern Europe and the Mediterranean, also occurs in a few desert parts of our study area. Some authorities consider *C. oblongifolia* to be conspecific with that rather variable, better-known plant.

ʻabal, arṭā, *Calligonum comosum* and *C. crinitum* subsp. *arabicum* (Polygonaceae) (figs. CD.99–CD.104): This plant was said to be used not only for tanning, but to produce a red dye used for clothing. The twigs and leaves (the latter are very fugaceous) were used. Abū Ḥanīfah ad-Dīnawarī, an excellent classical Arabic source of the late ninth century A.D., said, however, that the dye was prepared from the rind or epidermis *(qushūr)* of the roots of this plant (Lewin 1974, 173). I have seen exposed roots of ***ʻabal*** that are dark red in color.

gurūf, the dried rinds of the pomegranate, *Punica granatum* L. (Punicaceae): The rinds, sold in village markets, are used to obtain a yellow color.

jift, a plant substance (unidentified but said to be imported from Iran): Purchased in village markets, this substance is used to obtain a red color.

ʻarfaj, *Rhanterium epapposum* Oliv. (Compositae) (figs. CD.274, CD.275): The bright yellow flowers of this common grazing shrub are said to have been used in some way for yellow coloring.

athl, *Tamarix aphylla* L. (Tamaricaceae) (fig. CD.317): Philby described the ***athl*** trees during his visit to Wādī ad-Dawāsir, southern Najd, in 1918 as "in full bloom with the *Kirma* or pinkish clusters of tiny berries, which enjoy a great reputation as a dye and are said to be found only in the south, the *Ithils* of Upper Arabia being entirely barren" (1922, 2:181). In the Qaṣīm region of northern Najd later, he described ***athl*** trees as "well grown and tipped with the russet flowering which I had noticed in Wadi Dawasir. But here apparently the flower does not mature sufficiently to be used for the making of dyes, though, according to Tami, further north at Haïl some use is made of it" (1928, 185–86). It seems probable that it was not the flowers of this plant (which are not a very strong pink) but rather the capsules (which become strongly red in some species of *Tamarix*) that were used for dyeing.

4.6 Soaps, Cosmetics, Dental Hygiene Products, and Incense

Bedouins in the study area did not make (and apparently did not historically make) true soap—that is, fats saponified through the use of lye obtained from plant ashes—although Philby said that the ashes of ***shnān*** (*Seidlitzia*) were used for making "soap" (1933, 14). The Bedouins did,

however, wash with fresh or dried, untreated material from at least two alkali-rich, succulent shrubs of the family Chenopodiaceae. The main active substance is probably sodium carbonate (soda ash, washing soda), which has historically been extracted in several parts of the world from salt marsh chenopods such as *Suaeda* spp. (Dymock, Warden, and Hooper [1890–91] 1976, 3:141–42; Mabberley 1987, 562). The two plants listed here are of this type.

shnān, *Seidlitzia rosmarinus* Ehrenb. ex Bge. (Chenopodiaceae) (fig. CD.305): Among the Sharārāt, this plant is called ***duwwēd,*** "worm bush," probably in allusion to its terete, succulent leaves. All my consultants knew the use of this saltbush as a kind of "soap" for washing, although I saw no evidence that it was being used in the 1960s. This rounded shrublet, which grows to about 80 cm high, is usually found on hummocks on saline ground near ***sbākh,*** or salt flats. The leaves are stripped, dried, then pounded up for use. Musil indicated that it was the only washing aid used by the Ruwalah of average means in northern Arabia early in the twentieth century (1928a, 134). I have not tried ***shnān*** as soap, but Violet Dickson stated that the dried leaves, pounded up, "produce quite a nice lather" (1955, 86).

'ujram, ḥurḏ, ghaslah, *Anabasis lachnantha* Aellen et Rech. f. (Chenopodiaceae) (figs. CD.58, CD.59): This saltbush with jointed, virtually leafless stems is used in the same manner ***shnān*** is used, as "soap" for washing clothes, according to Shammarī and Hutaymī consultants. In our more southern study area, the bush is called ***'ujram.*** The Shammar use the name ***ghaslah,*** from the verb ***ghasal,*** "to wash." The Sharārāt call it ***ḥurḏ,*** which means "lye, alkali."

harm, *Zygophyllum qatarense* Hadidi (fig. CD.334), *Z. mandavillei* Hadidi (figs. CD.332, CD.333): Of a different family (Zygophyllaceae) and often of somewhat saline habitat, ***harm*** was also reportedly used as soap. But ***harm*** was said to be inferior to ***shinān*** for that purpose and to damage (perhaps stain) clothing (Philby 1933, 14).

sidr, *Ziziphus spina-christi* (L.) Willd. (Rhamnaceae): This tree, which grows up to 12 m high and is found in both spinous and unarmed forms, is usually seen only as a cultivated plant of the oases. It does grow wild in southern parts of Arabia, and I found it in the desert once in our study area, probably associated with an abandoned well nearby. The use of the leaves for washing is well known throughout Arabia, and leaf powder

is still sold in the spice and medicinal sections of traditional markets in our study area. The leaves are collected, dried, and pounded up to a fine powder. This material is usually used as a hair wash; it was traditionally also used to wash the dead. I have experimented with the powder as a shampoo, which is said to soften the hair and strengthen the roots. My experience with this product, which I found very effective even in hard water, was as follows: "Finely powdered leaves should be chosen in the market; flat leaf bits are more difficult to rinse out of the hair and provide less lather. A half cup of leaf powder well covered with warm water will begin to produce thin suds within a few minutes with little stirring. This mixture has a vegetable odor, but none is left in the hair. Two liberal applications, well rubbed in and rinsed between, leaves the hair soft and lustrous. It is superior to chemical shampoos in leaving the hair straight and more manageable" (Mandaville 1990, 207).

ḥinnā, *Lawsonia inermis* L. (Lythraceae): The henna shrub or small tree grows to about 2 to 7 m high with opposite, elliptical-oblanceolate leaves. It does not grow wild in the study area but is frequently cultivated in the oases (where I have also seen it spontaneous along roadsides) and as a decorative shrub in towns. The powdered dried leaves are widely used in the Middle East as a dyestuff that gives a characteristic orange-brown color. Women of both the desert and the towns use it cosmetically for making decorative patterns on the body, usually the extremities. H.R.P. Dickson, whose wife, Violet, had a close association with Bedouin and town women in Kuwait, reported that Bedouin women used henna only to decorate their hands, fingernails, and toenails, whereas the settled folk used it more widely. The powdered henna is mixed with water to make a paste then applied carefully in the desired pattern. It is then allowed to dry until it falls off. This process is repeated several times to obtain a dark enough color. The tint can be darkened to black by adding a second paste application made from lime and ammonia crystals (1951, 158–59). I was told that mixing an aqueous infusion of crushed dried limes into the paste would strengthen the coloring action and that recent practice was to add a small amount of motor gasoline to the paste to intensify the color. There is a general belief that henna also toughens the hands and feet against abrasion, and elderly men (including one of my consultants of the Qaḥṭān tribe) sometimes use it to dye their white beards reddish brown. People of the oases also use it to decorate their white donkeys with geometric patterns.

nafal, *Trigonella stellata* Forssk. (Leguminosae): This small, prostrate, sweet-smelling annual is, according to Violet Dickson, dried, pounded up, and used by women of the Shammar tribe as a hair dressing after washing (1955, 93).

kaḥal, kḥīl, kaḥlā, *Arnebia decumbens* (Vent.) Coss. et Kral. (fig. CD.72), *A. linearifolia* DC., *A. tinctoria* Forrsk., *A. hispidissima* (Lehm.) DC. (fig. CD.73), *Echium horridum* Batt. (figs. CD.157, CD.158), all of the family Boraginaceae: All the plants in this group are characterized by a crimson pigment present on the surface of their taproots. This coloration can easily be rubbed off, and Bedouin women sometimes rub the fresh root on their face as a sort of rouge. Violet Dickson reported the same application in Kuwait from *Arnebia decumbens* (1955, 19).

rāk, arāk, *Salvadora persica* L. (Salvadoraceae) (figs. CD.289, CD.290): The roots and twigs of this large woody shrub, which grows 1 to 5 m high, are made into toothbrushes (called ***msāwīk,*** sing. ***miswāk***) used throughout Arabia by both Bedouins and people of the towns. The ***rāk*** shrub grows today at only two places within our study area, one of which is near the small port (and ancient ruins) of al-ʻUqayr opposite Bahrain Island on the Persian Gulf coast. The other lies farther to the north and inland at a place called ar-Rākah, southwest of the ʻAwāzim Bedouin settlement known as Thāj (also an archaeological site). It probably also historically grew at the village called ar-Rākah between the coastal towns of ad-Dammām and al-Khubar. I have visited the two ***rāk*** sites in the study area on several occasions and always found evidence of recent digging and collection of the roots for toothbrushes. The ***miswāk*** toothbrush is also sold in all towns, often by sidewalk vendors, and much of this market material probably comes from western or southwestern Arabia, where the shrub is found much more commonly than in the Northeast.

The ***msāwīk*** are collected, stored, and sold in partially unfinished form as washed and dried lengths of yellowish white roots or twigs about 15 to 20 cm long and 1 to 1.5 cm in diameter. They are prepared for use by cutting back the epidermis and cortex from one end for about 2 cm. This exposes the fibrous stele, which after soaking and preparatory rubbing forms the "bristles" at the end of the stick (figs. 4.12, CD.291). The bristles at the distal end of the stick thus extend and are parallel to the "handle's" long axis rather than at right angles to it, as in a Western toothbrush. As the fibers become worn with use, they are cut off, and a new section

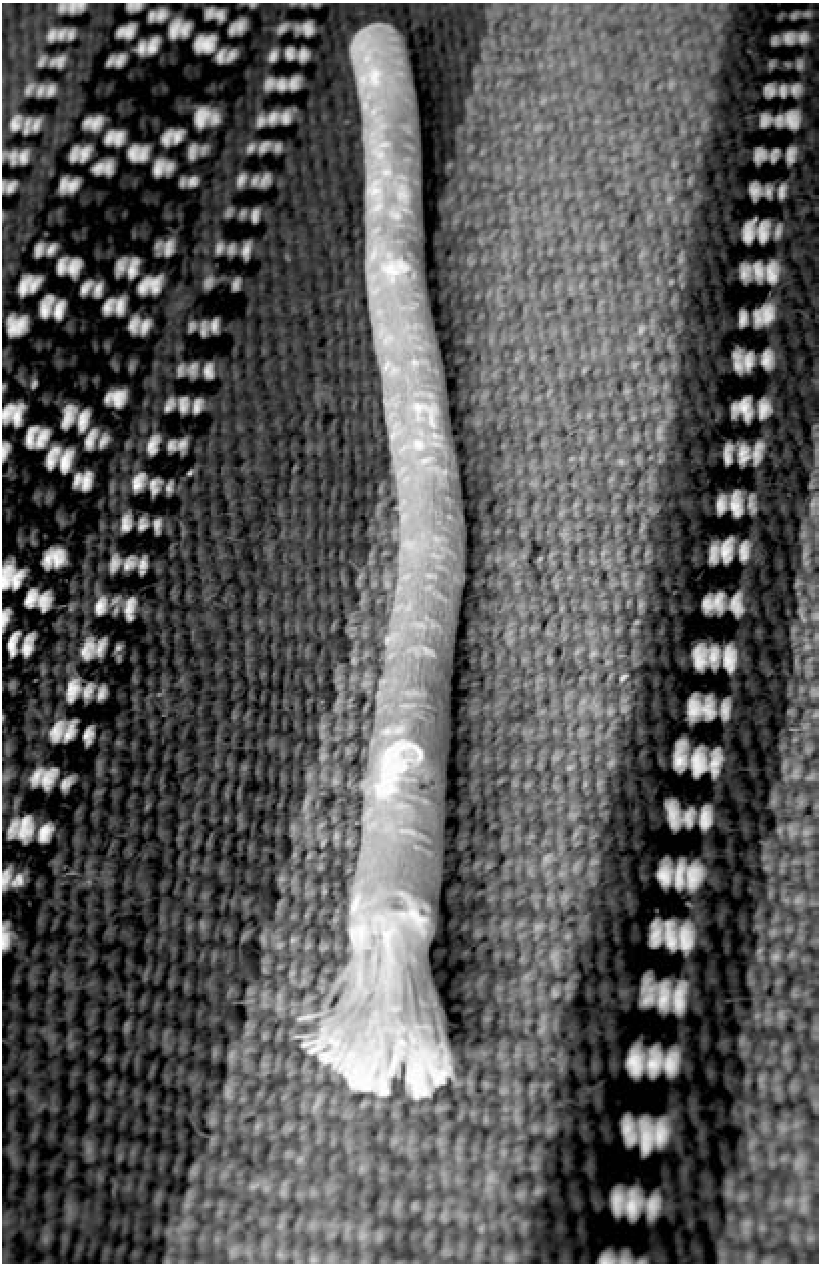

FIGURE 4.12. A ***miswāk,*** toothbrush, made from a root of the ***rāk*** shrub *(Salvadora persica).* Its overall length is 17 cm.

prepared, and this procedure is continued until the handle becomes inconveniently short. In use, the ***miswāk*** has a somewhat medicinal and astringent flavor that is said to act as a dentifrice and general mouth cleaner. No additional dentifrice is normally used with it. A commercial toothpaste containing *Salvadora* extract has been marketed in Saudi Arabia under the trade name "Fluoroswak."

Salvadora is not the only shrub or tree used in Arabia as a source of toothbrushes. I purchased some ***msāwīk*** in the Eastern Province city of ad-Dammām made from ***bashām,*** the balsam tree, *Commiphora gileadensis* (L.) Engl. (Burseraceae), of western Arabia. According to Nigel Groom, despite its name, it is probably not the biblical "Balm of Gilead" (1981, 126). My specimens are twigs 15 to 19 cm long and about 0.8 cm in diameter, with the thin, reddish brown bark still on. The ***bashām*** sticks have a somewhat bitter, resinous flavor and are said to give the breath "a good smell." They were said to have come from the western highland town of aṭ-Ṭā'if and were sold at the same price as the ***rāk*** sticks (two Saudi riyals for smaller ones, four for the larger ones, corresponding to about U.S.$0.60 and $1.20, respectively.

Bedouins in the study area, like people of the towns, use incense on more formal social occasions, usually after a meal that is considered a special occasion or sometimes just after tea and coffee for guests. The incenses used are plant materials not native to the study area but nevertheless of some interest. Incense is always used in a special burner called a ***midkhān*** or ***mibkhār*** (both grammatically nouns of instrument meaning, respectively, "smoker" and "censer"), usually tall and square in shape and made of decorated wood. The incense is not actually burned as a flame because doing so would not produce the desired aromatic effect. It is rather laid on glowing charcoal taken from the coffee fire so that it vaporizes with a whitish "smoke" but does not burst into flame. The ***mibkhār*** is brought out at the end of the meal after the guests, having eaten with the fingers of the right hand in traditional Arabian style, have washed up. Its appearance is a social signal that says, loosely, "This affair is finished now. Thank you for coming. Take this perfume with you (and thus let anyone you meet know that you have been our honored guests)." The censer is passed around the circle of guests, each fanning its contents a bit and holding it briefly under their chins or beards and within the folds of their cloaks to capture perfume. The incense materials used in this little ceremony are usually one but sometimes two of the following:

'ūd, *Aquilaria malaccensis* Lam., *A. agallocha* Roxb. (Thymelaeaceae): This plant product is sometimes called "aloes wood" in English, although it has nothing to do with the medicinal liliaceous genus *Aloe.* The name ***'ūd*** basically means "stick" (of wood), but it also refers specifically to this costly plant product, which is sold as small, irregular pieces, lumps, or splinters of wood, the most active parts of which are of darker color. It is imported from what is now eastern Bangladesh and from Southeast Asia, where it has been collected since ancient times. It is a pathological product of the *Aquilaria* tree, and its high price is a consequence of its rarity and the labor-intensive process of collecting it. Large trees have to be literally hacked to pieces by hand to discover the bands and spots of resinous material hidden in or near the heartwood (Dymock, Warden, and Hooper [1890–91] 1976, 3:217–24). When ***'ūd*** is placed on glowing charcoal, it emits a whitish smoke of sweet, pleasant odor, and it is considered to be the best incense material of the several kinds used in Arabia. In the 1970s, I purchased a half tola (6 g) of Cambodian ***'ūd*** for fifty Saudi riyals (about U.S.$14). It was considered high-quality material, but even more expensive grades are available. Its use is considered a more opulent show of hospitality than frankincense.

lubān, *Boswellia sacra* Flueck. (Burseraceae): This plant product is frankincense, which is the drops or lumps of resin collected from the trunk and limbs of (or sometimes the ground beneath) the *Boswellia* tree of Dhufar, southern Arabia, and the northern Somali coast of East Africa. It, like ***'ūd,*** is vaporized on glowing charcoal in the ***midkhān.*** I noted a retail price of thirty-five to forty Saudi riyals (U.S.$9.30 to $10.70) per kilogram in 1986.

Another kind of incense, called ***bākhūr,*** is sometimes also used. It is a commercially compounded product, possibly from India or East Asia, consisting of finely divided material that is probably largely of plant origin and sold as pieces of dried paste with perfume additives. It, too, is used by vaporization on glowing charcoal.

I have not observed Bedouins using the crude benzoin resin (from *Styrax benzoin* Dryander, Styracaceae) called ***jāwā*** (named for its Javanese origin). It is, however, a common item at markets frequented by Bedouins. The best grade (the darkest and most "resinous" with glossy fracture) was sold retail for forty Saudi riyals (U.S.$10.70) per kilogram in 1986.

4.7 Gunpowder, Crafts, and Construction

I had heard many reports from Bedouins of the use of ***'ushar,*** the giant milkweed *Calotropis procera* (Ait.) Ait. f. (Asclepiadaceae) (fig. CD.106), for the preparation in earlier days of black gunpowder, ***bārūd.*** Nobody, however, seemed to have had firsthand experience with the process, and some consultants, in particular the younger ones, had obviously fanciful ideas about it. A Bedouin of Banī Khālid, for example, told me that the large, round fruits of ***'ushar*** were squeezed to produce their milk-white sap and that the latex was then mixed with gunpowder and dried to make it "stronger" and to make "the bullets shoot straighter." Others thought that gunpowder could somehow be made from the plant without any other ingredients. I finally met some older and more experienced men who had actually made gunpowder or had the information from their parents. They explained that it was actually only the charcoal from ***'ushar*** that was used in gunpowder making. The plant—a tall, glaucous treelike perennial with leaves like opened leaves of cabbage—can be found growing in many parts of Arabia, although it is not encountered very often. I found it both in remote desert locations and as a ruderal around towns, including the oil company community at Dhahran and on vacant lots in the Red Sea port of Jiddah.

Crude muzzle-loading guns were widely used in Arabia. I remember seeing old men carrying them for bird hunting in the 1940s and 1950s in eastern Saudi Arabia. Even at this time, the powder they used was probably imported and purchased. Many gun supplies, including powder and preloaded shot shells for more modern shotguns, were brought in from England during that period. A few old-timers also still used old factory-made European rifles requiring black powder cartridges, such as the British single-shot Martini carbines, which used huge cartridges and .45-caliber bullets. Used cases for these cartridges were sometimes reloaded using black powder.

Black gunpowder everywhere was (and still is) normally made from three ingredients: saltpeter (potassium nitrate), sulfur, and charcoal. In Arabia, the charcoal from ***'ushar*** was favored above all others for such use—probably because the wood of this treelike milkweed is of a cork-like low density, fine textured and porous, and thus burns completely to a pure carbon and is easy to crush up into the required powdered form used

in the mixture. A consultant from Oman said that the other ingredients of gunpowder—sulfur and saltpeter—"came from the ground." An elder Qaḥṭānī who had made gunpowder told me that the ***'ushar*** wood was cut up into pencil-size pieces, then burned. The resulting charcoal was mixed with saltpeter (which he called ***malāḥ,*** a name related to that for common salt, ***milḥ***) and ***khaffān,*** a form of sulfur (the more usual name for sulfur in general is ***kibrīt***). Asked what proportions were used of each component, he said that as far as he could remember, a larger amount of saltpeter was used (which conforms with usual practice in powder manufacture).

Because sulfur was used medicinally, particularly for the treatment of camels afflicted with sarcoptic mange, ***jarab,*** it was sold in all village markets. The saltpeter was imported or in earlier times made by the Bedouins themselves. English traveler Charles Doughty gave an interesting account of how saltpeter was made at the time of his visit to northern Arabia in 1872–73. The Bedouins knew that "salts" (nitrates) were found in the excrement of livestock (either dung or urine or both), so they extracted the salts from the earth at places where sheep and camels were concentrated and sheltered, such as rock shelters, watering places, and old buildings. They would test such deposits by taste (presumably the ground tasted salty there), dig out the earth, and boil it with water in kettles. Then, Doughty said, they "let the lye of the second seething stand all night, having cast in it a few straws:—upon these yellow nitre crystals will be found clustered in the morning. With such (impure) nitre, they mingle a proportion of sulphur, which is purchased in the haj market, or at Medina. Charcoal they prepare themselves of certain lighter woods, and kneading all together with water, they make a cake of gunpowder, and when it is dry, they cut it with the knife crosswise into gross grains; such powder is foul and weak, and they load with heavy charges" (1936, 1:410).

Doughty also once directly observed the making of gunpowder by the Bedouins, on which occasion his subject used charcoal not from ***'ushar*** (a usage Doughty mentions), but from wood of the castor oil tree (*Ricinus communis* L.), which grows in Arabian oases. A Hājirī Bedouin of my study area gave the name ***khirwa'*** for the latter plant.

Bedouins in our study area did not make baskets or mats from plant material but purchased and used those made by the oasis folk and sold in village or town markets. Most of the Bedouins' handicrafts focus rather on the use of animal hair and wool in weavings and braided goods and

on the use of leather. The material usually used for purchased baskets and mats is leaves of the date palm (*Phoenix dactylifera* L.) (figs. CD.256, CD.257) or stems of the rush called ***nimaṣ*** or ***wasal*** (*Juncus rigidus* Desf.), commonly found in oasis wetlands. Bedouins often keep some ***līf,*** or date palm fiber, on hand for making small cords or rope or for other uses, such as the small wad always stuffed in the spout of the brass coffeepot to act as a filter that keeps grounds out of the cups. The fiber is purchased in village markets or simply taken from some of the date palm clumps that grow wild in coastal districts. Some tribal groups, such as sections of Āl Murrah at Yabrīn, also own date groves that they visit periodically or in which they have even settled. Palm fiber occurs in sheets, almost like woven cloth, around the trunk of the palm, behind the leaf stalk bases. Small cordage is made of ***līf*** by rolling it on the thigh. Some other plant materials may also be used. Klaus Ferdinand has a photograph of an elderly Bedouin man in Qatar making light rope of an unidentified plant fiber, possibly ***līf*** (1993, 94).

Violet Dickson reported use by the Shammar tribe of culms from the common desert sedge called ***'andab*** (or in the north ***muṣṣē'***), *Cyperus conglomeratus* Rottb. (figs. CD.140, CD.141), for making ropes. "It was first soaked in water," she said, "then beaten out between boards, and twisted up" (1955, 98–99). I did not hear of such use in our study area, and the heavier rope that I saw in use by Bedouins, such as for tent guys, was purchased, imported commercial rope of natural or synthetic material (fig. 4.13). The poles for tents were also purchased items from the towns, being either rounded natural pole shapes or planed and smoothed commercial lumber.

Wood is used in the construction of essential Bedouin hardware such as the frames or trees of riding and pack saddles, but these items are also normally purchased in the towns, all of which usually have a special hardware market area dealing in Bedouin supplies. The purchaser may modify and finish these basic structures, such as a saddle tree, and make repairs as required. The camel stick, which was formerly almost a required dress article among elder Bedouins, is made of a kind of flexible and strong rattan that Ferdinand says is imported from India (1993, 238). It may be straight or slightly bulbous at one end (and called an ***'aṣā*** or ***maṭrag***) or strongly crooked at one end (and then known as a ***bākūr***). The local oasis reeds, ***'agrabān,*** *Phragmites australis* (Cav.) Trin. ex Steud. (fig. CD.258)

FIGURE 4.13. A Banī Hājir consultant demonstrates how he hobbles his camel using a small rope of unidentified material, possibly date palm fiber. The camel's broad, cushionlike feet are an aid to locomotion in soft sand terrain.

or *Arundo donax* L., are not used because they break too easily. This was apparently the case even in earlier times; Musil indicated that the Ruwalah purchased rattan camel sticks from peddlers (1928a, 127). The Bedouins themselves may make a third kind of camel stick, called the ***mish'āb,*** which has an end piece at an angle to the main shaft but intrinsic with it, from wild desert shrubs. H.R.P. Dickson stated that this type of stick was cut from wood of the ***sidr*** "tree" of the Ṣummān (1951, 652). Dickson seemed to confuse this with the ***sidr*** tree of the oases *(Ziziphus spina-christi).* In fact, judged from the habitat, it must have been *Ziziphus nummularia* (figs. CD.330, CD.331). The form can be made easily only from the junction of a main and side branch of a woody shrub or tree.

Some wild plant materials have uses (at least historically) as stuffing material, such as for saddle pads and tent cushions. Such is the case with the amaranthaceous perennial ***rā*** or ***tuwwēm,*** *Aerva javanica* (Burm. f.) Spreng., which has thick fleece in its dense, flowering spikes. It was used to provide stuffing for saddle pads, according to a Hājirī consultant. Shammarī and Rāshidī Bedouins said that the cottony fleece of ***gṭēnah*** (also called ***ṭirf*** and other names), *Bassia eriophora* (Schrad.) Aschers. (Chenopodiaceae) (fig. CD.93), was used similarly.

4.8 Plants in Children's Play

Some desert plants are involved in children's play activities. One curious example is the cruciferous perennial *Farsetia aegyptia* Turra (figs. CD.177, CD.178) called ***haltā*** (scratchweed) by Āl Murrah and ***ḥamāh*** (hotweed) among the Qaḥṭān. It is a many-branched shrublet, 15 to 50 cm high, grayish with an indumentum of appressed hairs and narrowly linear leaves. Children use it to play "itching powder" jokes on one another. If a dried bush is rubbed briskly between one's hands, they pick up near-microscopic hairs that can then be transferred to someone's face or other tender-skinned part of the body, where they cause an intense itching, burning sensation. A hand lens shows fine downy hairs of a pink-white color that are no doubt responsible for the effect.

Bedouin parents tell their children about many edible wild plants, which leads to much "nibble experimentation" with parts of spring annuals, such as ***ḥambizān*** roots (fig. CD.159) and ***ṣiffār*** leaves (fig. CD.300). Such "tasting games" are probably responsible for Violet Dickson's (1955)

many reports of plants "eaten by children." These activities no doubt serve an educational role and help pass down information about edible plants to the younger generation.

Some annuals are used in play in other ways, such as young girls' collection of the pigmented roots of *Arnebia* spp. (figs. CD.72, CD.73) to rouge their faces (see section 4.6). Another example is the collection of the ringlike fruits of the annual vetch *Astragalus annularis* Forssk. (fig. CD.78), which Āl Murrah call ***abū khawātīm*** (father of signet rings) and other groups call ***aṣābi' al-'arūs*** (bride's fingers). The latter name alludes to the reddish flecks found on the tapered pods, which resemble the fingers of a bride whose hands are decorated with geometric designs made with henna stain. The pods of this plant are strongly compressed dorsoventrally and are usually curved strongly into a nearly complete ring-shape. Children pick and wear them as play finger rings.

CHAPTER 5

Plants as Concept and Name

5.1 The Origin and Purpose of Plant Life

MY BEDOUIN CONSULTANTS EXPRESSED a clear belief that plants were formed in all their kinds as an act of'creation by God and were intended for the benefit of man. Both of these ideas clearly reflect the tenets of orthodox Islam, expressed in the Qur'an in such verses as "It is He who created for you all that is on earth" (2:29), "It is He who sends down from the skies for you water to drink and from which [grow] shrubs and trees to which you send your livestock to graze" (16:10), and "It is He who sends down for you from the skies water whereby we bring forth vegetation of all kinds" (6:99). It is of interest with respect to arid lands cognitive ecology that Qur'anic descriptions of the generation of plant life are virtually always expressed not as direct acts of God but through the effects of rain sent down by God. Even animals are described as having been created from water (24:45).

Consultants interestingly also expressed the idea that *every* kind of plant has a created name, although "we don't know them all because some were forgotten or known only to the ancients [***al-awwalīn,*** 'those who came first']." This idea also has precedent in the Qur'an, which tells how God gave to Adam the names of all things: "And He taught Adam the names [of things], all of them" (2:31). The language of these created names is presumed to be Arabic, the language in which the Qur'an was revealed. Names for plants (as for other things) thus take on a revelational aspect that contrasts rather pointedly with Judaeo-Christian tradition, where God gives to Adam *himself* the opportunity to name the animals and birds of the earth (Gen. 2:19–20). This contrast may account in part (as described in chapter 7) for the long persistence of Arabic plant names with little change and, with respect to the written language, the early philologists' insistence on keeping them "correct."

Asking once on a whim whether plants might change form or "kind" over time, I was answered strongly in the negative, with a tone of surprised amusement. This response, although not unexpected, might be considered to lend support to the view that "kinds of living things" seem

to be universally assumed to have an innate, unchanging "essence" (Atran 1990, 58; see also remarks on this concept in section 5.3.1).

5.1.1 Plants and the Supernatural

I would hesitate to describe the Bedouins of our study area as "superstitious." They are of an eminently practical nature and smile at ghost stories. At the same time, however, they do generally avoid some places and things considered to be of bad omen and the abode of the creatures called ***jinn*** (classically *jānn*), singular ***jinnī***. The ***jinn*** are not treated as supernatural beings in the sense that they are "unexplained" phenomena. Their existence is quite accepted in orthodox Islam, where they are considered a third class of intelligent beings, the other two being humankind and angels (Macdonald 1953, 90). Their acceptance is near universal in Arabia among the untutored and even (as an Islamic belief) among many of today's college graduates. The scholar (at least the non-Muslim one) is tempted to see in the ***jinn*** remnants of pre-Islamic Arabia, where spiritual forces were often associated with objects of nature, living or nonliving.

The ***jinn*** are not considered to be intrinsically evil. They may be harmless or even sometimes helpful, but they are also mischievous and may play tricks on mankind that may be harmful or at least frightening. They are thought of as having a form similar to humans but are capable of assuming the shape of other creatures to suit their designs. The places they frequent are often old ruin sites, remote desert wells, and unusual rock formations. They are also associated with certain kinds of desert plants, which in my experience tend to be large, dense, dark-colored shrubs. Prominent among these plants in my eastern Arabian study area (and in the north, according to Musil [1928a, 416]), is the ***ʻōsaj*** (also ***ʻōshaj, ʻōshaẓ***), *Lycium shawii* Roem. et Schult. and *L. depressum* Stocks. This densely and intricately stiff-branched shrub, usually 1.5 to 2.5 m high, tends to occur in discrete groves of about five to fifty individuals. I have seen it on several occasions around abandoned ruins or graveyards in rural areas, which might account in part for its general spookiness. H.R.P. Dickson said that Bedouins will never cut wood from an ***ʻōsaj*** bush, and when approaching it, they will always invoke God's protection by saying the ***bismillāh*** formula ("In the Name of God, the Merciful, the Compassionate") (1951, 537–38). They will then throw a stone into the bush to appease the spirits.

I have never seen this little ceremony performed and have seldom been near these shrubs in Bedouin company, but I have seen ***ʻōsaj*** bushes with otherwise unexplainable piles of stones at their bases. All Bedouins know that the small, round, reddish ***ʻōsaj*** berries are edible (section 4.3), but I have never seen them collecting or eating these berries. Another shrub associated with ***jinn*** among the Ruwalah according to Musil (1928a, 416), is the ***sidr*** (*Ziziphus nummularia* [Burm. f.] Wight et Arn). The ***sidr*** is a large woody shrub of silt basins in the inland Ṣummān region of our study area and farther north. The Ruwalah, according to Musil, believe there is a spirit in each bush and that ***jinn*** have their gardens where the shrub occurs in groves (as it usually does). I have traveled with Bedouins in the Ṣummān ***sidr*** country of the study area and never noted any particular respect given this plant. H.R.P. Dickson reported that the chiefs of the Muṭayr tribe prize and guard the ***sidr*** trees of the Ṣummān and that the form of camel stick called the ***mishʻāb*** is cut from it (1951, 652). The ***jinn***'s association with the ***sidr*** may thus be restricted to the Ruwalah country farther to the north and west.

In the northwestern part of the Rubʻ al-Khālī is a place called Jawb al-ʻAṣal, "Basin of the ʻAṣal Bushes" (fig. CD.315), a low place overlooked by dunes dotted with large, dark ***ʻaṣal*** shrubs (*Suaeda monoica* Forssk. ex J. F. Gmel., Chenopodiaceae). This big, succulent saltbush grows 1 to 3 m high. It grows nowhere else in the study area, and I consider the stand a relic of a wider population that extended from the southwest in earlier, pluvial times (Mandaville 1990, 83). I passed through Jawb al-ʻAṣal in a motor convoy in 1965, and our Marrī guide obviously preferred not to spend the night there even though I had heard of the place and wanted to stop. He had explained the previous day how this place was considered haunted, a condition he connected with the unusual ***ʻaṣal*** shrubs growing there. He was not in the least surprised when our main supply truck broke down with a rear differential problem amid the ***ʻaṣal*** bushes, interrupting the trip with two days of repair work, the only mechanical mishap of a ten-day expedition.

Charles Doughty, traveling in northwestern Arabia in 1876–78, was stopped by his Arab traveling companions from cutting some pieces off an *Acacia* tree for tent pegs. One of the defenders said that the tree was ***jinn*** possessed and that after one of his fellows had broken just one branch, he had died along with all his livestock. It was said that after a little girl

gathered only one fallen stick for firewood, her arm became paralyzed (1936, 1:411). Trees and shrubs, Doughty found, were often thought to be ***manāhil*** (sing. ***manhal***), the camping or descending places of angels or ***jinn,*** magical places where travelers would put offerings of beads and cloth pieces, and he wondered if such places were hangovers from ancient tree worship in pre-Islamic Arabia (1936, 1:497).

W. Robertson Smith (whose data remain useful despite the general discrediting of his totemic theory) recounted from classical Arabic literature the story of Ḥarb ibn ʻUmayyah and Mirdās ibn Abī ʻĀmir, historical personages of the generation before the Prophet Muḥammad. They set fire to a shrub thicket to clear it for cultivation. The ***jinn*** of the place flew away in the form of white snakes, and the two men died soon after. "Here the spirits of the trees take serpent form when they leave their natural seats, and similarly in Moslem superstition the *jinn* of the *ʻoshr* and the *ḥamāṭa* are serpents which frequent trees of these species" ([1894] 1956, 133). The *"ʻoshr"* here is our friend ***ʻushar,*** *Calotropis procera* (sections 4.1, 4.4, 4.7); the *"ḥamāṭa"* is the wild fig of the Ḥijāz mountains. Henri Lammens, in his valuable account of western Arabia at the time of the birth of Islam, speaks of the pre-Islamic sanctuaries of the Ḥijāz and their cult trees given votive offerings as well as of how the Prophet himself tolerated the sacred ***samurah*** *(Acacia tortilis)* of al-Ḥudaybiyah (1914, 70–71).

With respect to the apparent, present-day bans sometimes observed on the cutting of ***ʻōsaj*** or (by some tribes) of ***sidr,*** I would note that both of these shrubs are in any case hardly prime candidates for fuel. The ***ʻōsaj*** has short, stiff, almost spinescent branches that are tough and hard to cut; ***sidr*** is armed with vicious hooked spines that leave anyone hesitant to approach too closely ever again once they have tried to release themselves from its bite.

5.1.2 Plants in Bedouin Cosmology

I will not resist repeating a folk account of the creation of mankind as told to me by ʻAlī ibn Saʻīd ibn ʻAlī of al-Makhaḍibah of Banī Hājir on 5 June 1976. It is obviously based to some extent on the Qur'an yet differs from it significantly in several respects. Plants or plant products figure in two parts of the story:

> God created Adam out of clay, but Adam had no wife. So God created Eve out of Adam's rib, and thenceforth men have had seven ribs on one

side but only six on the other. Adam and Eve lived in paradise, where angels had told them never to eat of the tree called Zaqqūm. [ʿAlī pronounced this name with classical *qāf.* In the Qur'an, "Zaqqūm" is the name of a poisonous tree in hell, which the damned are condemned to eat, but here it is treated as "the forbidden tree" of paradise. I recorded recent use of the plant name ***zaqqūm*** in 1969 in the southwestern highlands of ʿAsīr. There, on the highest mountain in Saudi Arabia, at Āl Mujaddah summit at an elevation of 2,890 m (9,400 feet), a mountain villager gave it to me for *Marrubium vulgare* L., the common horehound that grows wild there. The noun form appears in the lowland Bedouin plant lexicon in at least two cases: ***tannūm,*** for *Chrozophora oblongifolia*, and ***shaḥḥūm,*** for *Gagea reticulata*.]

Satan wanted to deal with Adam and Eve, but he could not get into paradise because that realm was forbidden to him. He told his problem to a huge viper the size of a camel. The viper then swallowed up Satan into his chest and with him inside crept up to the gate of paradise and spat him through, but in a disguised form—that of a well-dressed shaykh, or learned man.

The shaykh walked up to Adam and counseled him to go ahead and eat of the tree, Zaqqūm, which, he said, was actually very good fare. Adam believed him and ate of the tree. Adam's stomach immediately swelled up with poison, putting him in enormous pain. But Satan (still disguised) proposed a solution. "Take your ***miswāk*** stick [the stiff toothbrush carried by Bedouins, made from the root of the ***rāk*** shrub, *Salvadora persica,* described in chapter 4] and ram it up your backside from below."

Adam did this, and when he had made a hole up into his belly, the poison was released through it, and he was greatly relieved. Ever since that day mankind has had to defecate and urinate. Before that, men and women only sweated.

5.2 Plant Anatomical Terms

The Bedouin vocabulary of plant anatomy is simple and of course confined to gross morphology (fig. 5.1). The roots of any plant are called ***ʿirūg*** (sing. ***ʿirg***), a term used also for the veins or nerves of animals and for an elongated dune. The root crown, or ground-level base of a shrub

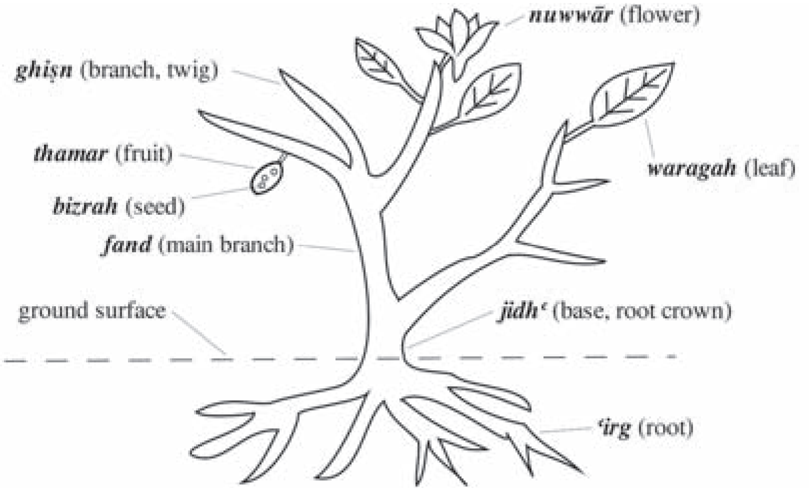

FIGURE 5.1. Bedouin names for parts of a desert shrublet (diagrammatic).

from which spring both roots and branches, is given several synonymous names, varying by tribe or geographical region. The most generally used term is ***jidh‘*** (unit. ***jdha‘ah;*** pl. ***jdhū‘***), although one Marrī consultant said that this name was really properly used only for the date palm and that the preferred general term for this part of desert shrubs was ***gā‘ah*** (pl. ***gā‘āt*** or ***gū‘***). A Qaḥṭānī used the term ***gā‘dah.*** The parts of a shrub generally preferred and collected for firewood are called ***jdhū‘.*** As firewood, they are also referred to as ***jrūm*** (sing. ***jirm***).

For true trees with boles, as with some *Acacia* species (such forms are in fact very rare in our study area), the trunk is called ***sāg*** (pl. ***sīgān***) or (among northern tribes) ***‘aḏd*** (pl. ***‘iḏūd***).

A main branch of a shrub—that is, one of the few lower ones springing from the root crown that do not normally bear leaves—is called ***fand*** (pl. ***fnūd***). On the ***fnūd*** are attached the more terminal branches referred to as ***ghṣūn*** (sing. ***ghiṣn***). As an elder Qaḥṭānī explained, ***"Al-ghṣūn taṭla‘ fil-fnūd"*** (The ***ghṣūn*** come out on the ***fnūd***). The same consultant offered ***‘aṣā*** (pl. ***‘iṣīy***) as a synonym of ***fand,*** a word that means simply "stick (of wood)" in the majority of Arabic dialects. The term seems to imply a degree of stiffness and perhaps leaflessness that is not found in the more terminal branches, the ***ghṣūn.*** Leaves are, in collective form, called

warag (sing. ***waragah,*** pl. ***ōrāg***). The term implies a flat form; the word is used in general Arabic for both plant leaves and the pages or "leaves" of a book, and my impression is that the Bedouins don't use this term for structures that botanically are leaves but that have been modified to terete or other thickened shapes, as in many chenopodiaceous shrubs. All that part of a shrub that is above ground is sometimes referred to collectively as ***shūshah*** (pl. ***shawash***). The same term is used among some southern tribes for a form of haircut sometimes given young boys, where the hair is shaved close except for a long, thick central tuft growing upward from the top of the head. Flowers are generally called ***nuwwār*** (the same form in plural and singular, although there is some evidence for use of a plural form, ***nawāwīr*),** from a linguistic root denoting "shining, glowing" and from which are also derived the terms for "light" ***(nūr)*** and fire ***(nār).*** The general Arabic (but non-Bedouin) word for flower, *zahr,* is recognized but only as the name of a specific plant, the large- and yellow-flowered *Tribulus* found in the Rubʻ al-Khālī and some other deep sands. A Hājirī consultant regularly used the term ***zibrij*** for some intricate inflorescences, specifically the globose umbel of the wild onion, *Allium sphaerocephalum,* and the dense racemes of *Tamarix* species. Lexicographers report the term *zibrij,* with the literal meaning of "ornament, a kind of jewelry," to be a Persian loan word. The fruits of a plant (in the botanical sense) are called ***thamar,*** but the term is used only when the ovary is visibly enlarged and fairly conspicuous. A seed is called ***bizrah*** (pl. ***bzūr***).

For annual plants, the terminology is restricted to ***ʻirūg*** (roots), ***warag*** (leaves), ***nuwwār*** (flowers), sometimes ***thamar*** (fruits), ***bzūr*** (seeds), and possibly ***ghṣūn*** (for a branched stem). Bedouins sometimes use the terms ***waragah*** (leaf) and ***nuwwār*** (flower) in an extended, somewhat metaphorical sense for "new vegetation" (see section 5.4). Some anatomical terms are family, genus, or even species specific. The dense spicate or paniculate inflorescence of grasses is called a ***sanbalah*** (pl. ***sanābil***). Among the Shammar (and perhaps others), the papery winged fruits of many perennial chenopods are ***jrūs*** (sing. ***jirs***). The word ***jrūs*** means "bells," not the bell-shape form usually thought of in the West, but the spherical shape of the slit brass bell with multiple teeth descending from an apex, the type used around the necks of livestock or made for decorative use in India. Tribes in Najd, where there are many *Acacia* trees, call the spherical or spicate inflorescence of that genus ***baram*** or ***ballah***

(pl. ***blūl, ballāt***) and its fruit pods ***ḥibl*** (sing. ***ḥiblah***) or ***ḥanbal*** (sing. ***ḥanbalah***).

The flowers and fruits of some individual species sometimes have names, restricted only to that plant, when they have uses such as for food. Several examples are given above in section 4.3. A folk generic–limited term may be used even in the absence of use (or presently known use) when a structure is particularly conspicuous, as in the case of the bright red or yellow, densely fringed hanging fruit of ***'abal*** (*Calligonum* spp.), which Āl Murrah call ***natharah*** (sing. and pl.).

Cecil Brown discusses the relationship between words for "tree" and "wood" (the material) in many languages and refers to work demonstrating that in some two-thirds of the world's languages the same term is used for both (1984a, 60–62). In such cases of polysemy, he argues for *wood* as usually being the more basic term, which becomes extended to mean "tree." The material "wood" in Bedouin (and town) Arabic is called ***khashab,*** a term implying some aspects of "lumber," a product found in towns and either of local cultivated origin or (more usually) imported from other countries. A Bedouin would apply the term ***khashab*** to the material of which his camel saddle frame is made by village craftsmen, even if he knows it comes from an Arabian tree such as the ***sidr*** *(Ziziphus spina-christi)*. ***Khashab*** is not generally thought of as a desert product, and the word is not linguistically related in any way to the Bedouin term for shrubs and trees, ***shajar,*** or apparently to any other plant-related item in their lexicon. This is perhaps not surprising, considering the rather limited use that Bedouins make of desert plant materials in crafts and construction.

5.3 Classification and Nomenclature

5.3.1 The Development of Folk Classification Theory

This section, which is something of a theoretical aside, aims at providing a basic summary of folk classification theory and terminology as they have developed since the 1950s. I give special attention to Brent Berlin's framework, which has become to great extent a model or starting point for other workers. Beyond that, I am necessarily selective but have tried to provide a basic theoretical context for the language and concepts in my interpretations of Bedouin folk classification.

Descriptions of some aspects of humans' relationship with the natural world of plants and animals are as old as ethnology itself. Early ethnobotany (first use of the term *ethnobotany* is generally attributed to Harshberger in 1895, published as Harshberger 1896), however, was concerned almost exclusively with the uses of plants rather than with concepts of the plant world. Until the mid–twentieth century, a typical "ethnobotany" consisted of a list of plants with scientific names, often arranged according to the families of Western botanical taxonomy or according to the alphabet, giving for each entry a "native" name (more or less correctly assigned and transliterated) and then a description of how each plant taxon was used, whether for medicinal purposes, food, construction materials, or tools. This approach was not the universal ideal. Melvin Gilmore, for example, pointed out with respect to American native groups that "it is not Indian economic botany only which we should seek. . . . We should learn what their naturalists know about plant anatomy. . . . We should obtain their views of plant taxonomy and their methods in nomenclature . . . what they know of the relation of plants to their environment . . . and of association of species" (1932, 324). It is fair to say that in practice, however, these finer points were generally neglected; it was in fact the "economic botany" that continued to prevail.

By the 1950s, several of the social sciences were undergoing a shift in approach that could be called at least quasi-paradigmatic. This shift was the "cognitive revolution" leading away from strict behaviorism in psychology and to Noam Chomsky's interpretation of grammar as a mental object in linguistics (D'Andrade 1995). In ethnography, there was a new focus on the conceptual, mental aspects of societies under study, with emphasis on the semantics of words (terms) in the studied subjects' minds. This focus led to rapid developments in the field called *ethnographic semantics,* with an early concentration on the analysis of kinship terminology. It was soon extended to other domains, as in Duane Metzger and G. Williams's analysis of the concept of "firewood" among the Tzeltal of Mexico's Chiapas highlands (cited in D'Andrade 1995, 58–62) and in Charles Frake's (1961) taxonomy of the kinds of illnesses recognized by the Subanun of Mindanao, Philippines. Frake, one of the early successful practitioners of ethnographic semantics, evaluated the approach succinctly: "The analysis of a culture's terminological systems will not, of course, exhaustively reveal

the cognitive world of its members, but it will certainly tap a central portion of it. . . . To the extent that cognitive coding tends to be linguistic and tends to be efficient, the study of the referential use of standard, readily elicitable linguistic responses—or *terms*—should provide a fruitful beginning point for mapping a cognitive system" (1962, 75–76, emphasis in original).

It is generally recognized now that humans' concepts and mental arrangements of living things—plants and animals—may be fundamentally unique in several respects. Each basic kind of living thing seems to be presumed to have an intrinsic but hidden special nature, or "essence," that is not present in nonliving natural or man-made objects (Atran 1990, 57–58). I would speculate that this unique view could have arisen easily from humans' universal observation of the reproductive faculty of living things and the commonsense notion that "like begets like." Pine seeds reliably produce more pine trees, not oaks or elms. Some invisible pattern is being passed down through the generations. The scientist with his theories and instruments calls this pattern "genes" or "DNA coding"; the nonscientific observer assumes there is "something in there," some kind of "pineness," but is not sure what.

Another special feature of human conceptualization of living things is, at least to some extent, the mental organization of such objects in hierarchical, inclusive ways based on the notion that one thing is "a kind of" something else—for example, that a pine is "a kind of" tree (see Wierzbicka 1996, 372, who cites Atran and Hunn 1990 with similar views). One might be marked correct in a scholastic examination in saying that "pine is to tree as chair is to furniture," but a closer examination of the two relations shows that they are fundamentally different. This difference is indicated by linguistic evidence. One can say (speaking of a single object), "Look at that tree!" but not "Look at that furniture." *Chair* is a countable noun, but *furniture* is a mass noun. In addition, one can easily imagine and sketch in a few seconds a picture of a "tree" (in a general sense, just "a tree"), but one cannot imagine or draw (as a single object) "a furniture." "Furniture" is an abstraction based on cultural *function.* Similar considerations apply to other groupings of artifacts such as "tools" or "toys" (Wierzbicka 1984, 317). The "kind of" relationship implies a "vertical" structure such as that exhibited by figure 5.3 showing Brent Berlin, Dennis Breedlove, and Peter Raven's 1973 scheme.

Plant and animal kinds and groups can also, however, be related in a "horizontal" manner, where taxa are considered to be not "kinds" of others but rather "like" or "different from" others. Another important basis for horizontal relationships is that of binary opposition, where features of contrasting taxa are perceived as opposite ends of a dimension such as size ("big versus small") or woodiness ("hard/woody" versus "soft/herbaceous") resulting in the life forms "tree" and "herb" (Brown 1984a, 99–104). Most specialists in folk classification admit the existence of both vertical and horizontal relationships, but they may differ on the emphasis that should be given to each.

Harold Conklin (1954) had already applied some of the new cognitive techniques in his doctoral dissertation on the ethnobotany of the Hanunóo of Mindoro Island in the Philippines. This work, as described by Berlin, was "the first ethnographically and botanically sophisticated description of a full ethnobotanical system of classification for a nonliterate society" (1992, 4).* Some of Conklin's descriptive terminology for his Hanunóo data appears somewhat foreign to workers today, such as references to the "exocentricity" and "endocentricity" of name forms, but his concepts are clearly familiar. A few years later he set forth some of the basic terminology seen in recent folk biological classification work. A key concept there was the use of the lexeme as the data unit of folk classification, his lexeme being a "meaningful form whose signification cannot be inferred from a knowledge of anything else in the language" ([1962] 1967, 121). Thus, to use two of Conklin's own examples, the expression *pitch pine* is a single lexeme, whereas *cheap pine* is not. Conklin's classification of

*Berlin's description here is a bit misleading with respect to "nonliterate society." Conklin's work was in fact atypical in that his "chief informant" and in some areas 60–75 percent of this informant's countrymen were able to read and write using a forty-eight-character Indic-derived script (Conklin 1954, 17–18, 56). The question of study consultants' literacy is always a factor in folk classification work, primarily because the ability to read implies the possibility of general education, which worldwide often includes some elements of Western folk classification or some basic concepts of Western scientific taxonomy. Consultants might thus be tempted to answer classification questions in terms of school-learned views rather than in terms of their everyday speech. Robert Randall and Eugene Hunn describe this process and give some interesting firsthand examples from Randall's work with Sinama-speaking (southern Philippines) consultants (1984, 333). In chapter 7, I allude to a similar process in Saudi Arabia. With respect to Conklin's work, some remarks he makes (e.g., 1954, 18) indicate that such "tainting" of his data was in fact unlikely.

lexemes has been subsequently refined in some respects, but his basic concept is still valid. He also described levels of contrast and types of contrast, such as inclusion (a pine is a kind of tree) and exclusion (a pine is not a kind of oak) and the hierarchic structure that characterizes many folk classifications. He defined folk taxonomy as "a system of monolexemically-labeled folk segregates related by hierarchic inclusion" ([1962] 1967, 128).

The next major landmark in the development of folk classification theory was Berlin, Breedlove, and Raven's (1973) description of general principles considered applicable to the speech of virtually all nonliterate societies. This description was based in part on their study of Tzeltal (southeastern Mexico) folk classification and incorporated data from a number of other studies dealing with unrelated languages.

With respect to nomenclature, Berlin, Breedlove, and Raven built on Conklin's concept of the lexeme but argued persuasively for a refinement in the two basic lexemic types that Conklin called *unitary* and *composite.* Under this revision, lexemes are, first, either "primary" or "secondary." Primary lexemes are often (but not always) unique single-word expressions such as *oak, pine,* or *maple.* Secondary lexemes are composed of primary lexemes with the addition of a modifier, such as *white oak, ponderosa pine,* or *sugar maple.* Primary lexemes are further subdivided on the basis of whether they are semantically unanalyzable, such as *oak,* or interpretable to some degree with respect to meaning, such as *crabgrass.* Analyzable primaries break further into the subcategories "productive" or "unproductive," the former being names such as *crabgrass* or *creosote bush* that include the label of an immediately superordinate category (here, *grass* and *bush*). Unproductive analyzable primaries are semantically transparent to some degree but do not include the name of a superordinate taxon—for example, *butter and eggs* (the plant); *poison oak* (poison oak not being a kind of oak).

Productive primary lexemes superficially resemble secondary lexemes but differ by their occurrence in contrast sets wherein some members do not include the label of a superordinate taxon. Thus, the lexeme *crabgrass* contrasts directly with *fescue, grama,* and *tanglehead* (other kinds of grasses). Secondary lexemes, by contrast, are involved only in sets wherein every member names the superordinate taxon: *white pine, pitch pine, yellow pine, ponderosa pine.* This lexemic typology is summarized in fig. 5.2, which includes two examples of each type.

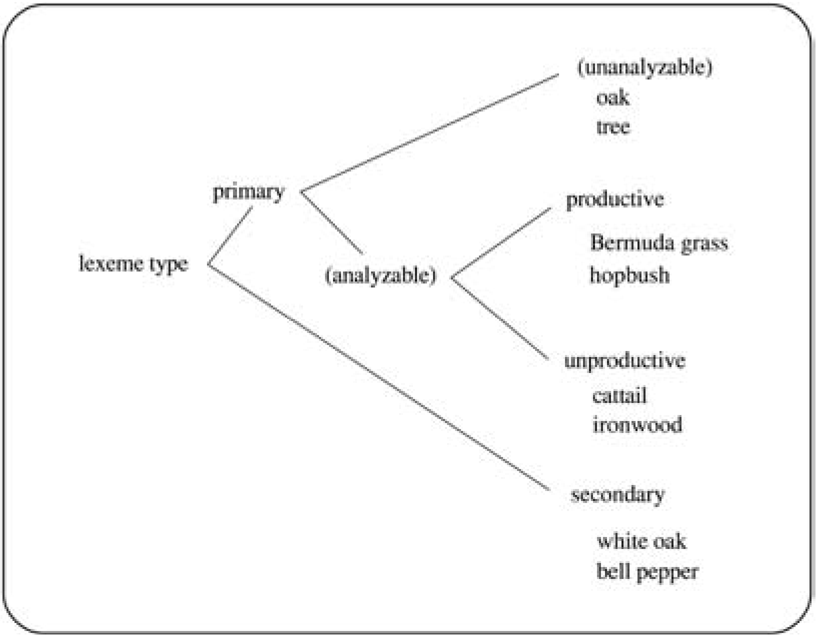

FIGURE 5.2. Relationships of lexeme types (after Berlin, Breedlove, and Raven 1973, 218).

With respect to folk biological classification, Berlin, Breedlove, and Raven postulated a five- or six-level hierarchic structure with five or six categories treated as basic across all nonliterate societies and across different languages. They used the following terms for the categories (proceeding from the more to less inclusive): *unique beginner* (unique in the sense that, unlike the others, it does not belong to a contrast set with one or more other members), referring to all plants or all animals in general; *life form,* which includes widely used terms for groups of kinds of organisms, such as *trees* and *vines* with plants or *snakes* and *bugs* with animals; *generics,* referring to basic kinds of plants or animals, such as *oak* or *squirrel; specifics,* which are particular kinds of generics (where the latter are subdivided by name); and *varietals,* which are named subdivisions of specifics. A sixth possible category going by the term *intermediate* was proposed as falling between the life form and generic but requiring further evidence for consideration as a cross-cultural category.

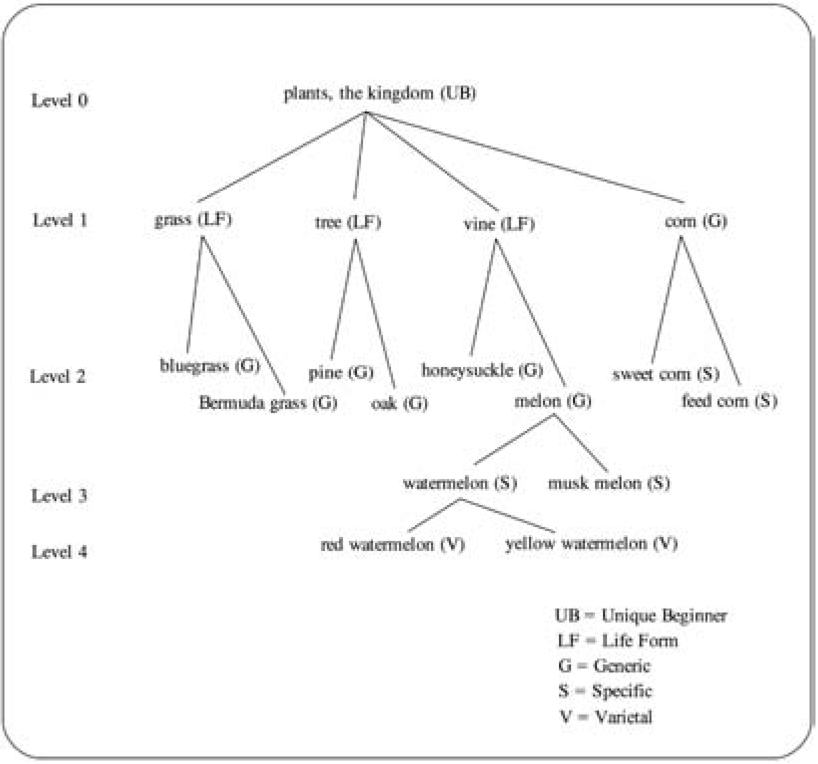

FIGURE 5.3. Diagram of Berlin, Breedlove, and Raven's 1973 folk classification model. Examples have been added from American English folk classification. The taxon "corn" is treated here as an unaffiliated generic and thus occurs at level 1 rather than at the usual level 2 for generics. Due to space constraints, only a few of the actually existing taxa are shown at levels 1–4. The category "intermediate" is not shown; when present, it would add a level between life form and generic. After Berlin, Breedlove, and Raven 1973, 215.

Berlin, Breedlove, and Raven presented this scheme in diagrammatic form (fig. 5.3).

These authors pointed out some characteristics of these general categories that are for the most part constant across different cultures and languages. The unique beginner is often unnamed in many unwritten languages; thus, the majority of languages among nonliterate societies do not have words for "plants" or "animals" in general. The most basic, numerous,

and often used category of organisms is the generic, which corresponds to such common English plant names as *oak, daisy; deer* and *skunk* among animals. The generics are numerous, but in number they tend not to exceed roughly five hundred in any given language. Most generics are grouped together into more inclusive categories (life forms), such as "trees" and "vines" or "snakes" and "fish." Life forms are limited in number and usually do not exceed something on the order of ten in any language. A few generics are said to be unaffiliated in that they are not considered to be a member of any life form. These generics are often of particular cultural importance or exhibit unusual anatomical structure. Some generics (usually a minority) are subdivided into specifics that have labels including the generic name and a modifying adjective referring to some attribute of the specific. Thus, in American English *white oak* is a folk specific referring to a particular kind of oak. Specifics in some cases (although these cases are rather rare) may be further subdivided into varietals, which then carry the specific name with an added attribute—for example, *baby lima bean* (a kind of lima bean, which is in turn a kind of bean). Organisms labeled as specifics or varietals tend to be of special cultural importance—often domesticated plants or animals. The category called *intermediate,* where it exists, tends to be nameless or "covert," its presence indicated by indirect means.

Berlin, Breedlove, and Raven pointed out also that taxa of the same category generally and cross-culturally appear at the same taxonomic levels. The unique beginner always occurs at level zero, and life forms occur only at level one. Generic taxa generally occur at level two but may (when they are not affiliated with any life form) be found at level one. Specifics are usually positioned at level three but may occur also at level two when included in an unaffiliated generic. Varietals, when present, are generally found at level four but may be found at level three when ultimately included in an unaffiliated generic. Examples of many of these cases are given in figure 5.3.

The types of lexemes used to label the general categories are also to some extent predictable. In general in all systems and languages, the generic, the life form, and (when present) the unique beginner are labeled with primary lexemes. Secondary lexemes are applied to the infrageneric categories called *specific* and *varietal.*

The launching of Berlin, Breedlove, and Raven's model, particularly after it was taken as the basis of their classic work on Tzeltal plant classification

(Berlin, Breedlove, and Raven 1974), greatly stimulated folk classification research across a broader range of societies with the objective of testing these "general principles." Their model also came under some criticism, though. Some of these critiques were matters of terminology. Ralph Bulmer (1974), for example, objected to use of the term *generic* for the basic folk name category because it implied the existence of a further subdivision that often did not exist and because many uninomials referred to logical or biological species. Brown (1974) questioned the validity of covert (unnamed) categories as elements in folk classification. Other criticism dealt with structural matters. For example, Eugene Hunn and David French (1984) questioned the pervasive application of the hierarchical principle of inclusion, pointing out that among their Sahaptin consultants (northwestern United States) many conceptual relationships between plants were not examples of hierarchical structure but rather of "coordination," referring to relationships with "core" or prototypical taxa. Roy Ellen suggested by implication that Berlin and associates, in imputing a strictly hierarchical system of ethnobiological classification to all societies, were in fact imposing their own structural biases derived from the Western classical Linnaean system of scientific taxonomy (1986, 87).

In 1992, Berlin reformulated his model and supporting arguments in book form, incorporating revisions based in part on the critiques summarized here and in part on considerations of new data. He emphasized that "these proposals are to be considered as hypotheses for testing against new empirical data" (1992, 21).

One of the more noteworthy revisions in the 1992 scheme was the dropping of the former numbered "levels" that partitioned the vertical dimension of the 1973 taxonomic tree diagram (fig. 5.3). Berlin dropped the tree diagram, whether inverted, horizontal, or otherwise, and replaced it with variations on the Venn diagrams of mathematical set theory (fig. 5.4), a convention that other authors had already used with respect to folk classification (Hunn 1976).

These shifts were no doubt generated at least in part by criticisms that Berlin, Breedlove, and Raven were "imposing" the system of Linnaean taxonomy (with its characteristic tree diagram) on data from their consultants—an issue that has led also to many authors' general avoidance of the term *taxonomy* in reference to folk systems. In addition, "intermediate" is now accepted as a full-fledged member of the

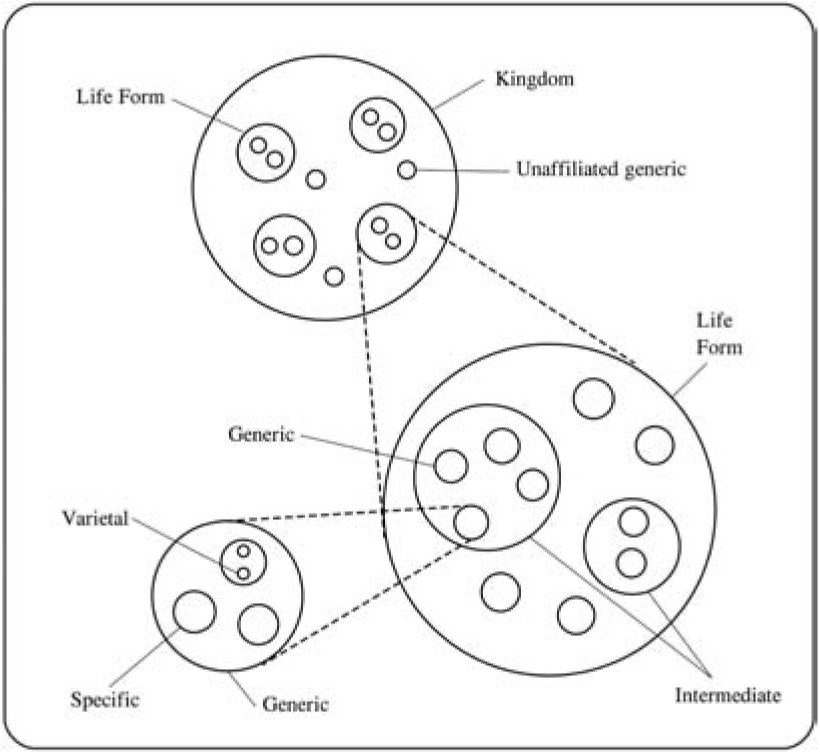

FIGURE 5.4. Telescoping Venn diagram of ethnobiological ranks. Simplified from Berlin 1992, 23.

family of ranks, although its absence in some systems is recognized by indicating that ranks may number "from four to six." The phenomenon of prototypicality is explicitly recognized along with its influence on some areas of nomenclature. The term *kingdom* replaces the less intuitive *unique beginner* for the most inclusive category. Berlin also, in my view successfully, defended continued use of the term *generic* for the basic-level rank.

Specialists in the field by no means universally accept Berlin's conceptual scheme for ethnobiological classification, with all its explicit or implicit ramifications. The scheme, however, has become not only a handy model and set of terms but the standard against which the great majority of workers now describe and compare their new materials. Given

its reasonably good fit with my Bedouin Arabic data, I have not hesitated to adopt it as a basis for description and discussion.

Other workers, meanwhile, were making important contributions to the field of folk classification in general. Brown (1984a) carried out a multistage investigation of the life form rank, culminating in a synthesis demonstrating that a basic inventory of life forms for both plants and animals is found cross-culturally. This study with respect to plants (I focus here only on the ethnobotanical side) reviewed 188 languages from diverse geographical and ecological regions, examining use of the life form classes glossed in English as *tree, grerb, bush, vine,* and *grass* (*grerb* is a term coined for convenience from *herb* and *grass,* reflecting the frequent folk grouping of these two forms in a single class). Brown demonstrated not only that these life form classes were widespread, but that there were cross-cultural constraints on the combinations in which they can occur. These constraints involved "implicational relationships" of the kind discovered for the cross-cultural nomenclature of eleven basic color categories by Brent Berlin and Paul Kay (1969). This kind of relationship is evident when the existence of one term "implies"—virtually "requires"—the existence of another, but not vice versa. Thus, with regard to the hue aspect of color in Berlin and Kay's study, it was found that languages that had a term for "green" almost invariably had also a term denoting "red." The reverse was not true: some languages had a term for "red" alone. These combinational constraints implied that color terms were acquired by languages in a small number of determined orders; in the case of red, red precedes green. Berlin and Kay listed seven evolutionary language stages characterized by what color terms had evolved. Stage I languages had terms only for broad spectral segments glossed "black" and "white"; stage II encoded black, white, and red; stage III had black, white, red, and green (or yellow), and so on (Berlin and Kay 1969, 22–23).

Brown found that plant life forms also varied in number. A few languages had a term only for "tree" (broadly defined), some only for "tree" and "grerb." "Grerb" was not found alone, however, and a label for "bush" could occur only if both "tree" and "grerb" (or "grass") were also found. Languages could be classed in any of six evolutionary stages determined by the number of basic life form types they had developed. Brown summarized these implicational relationships and evolutionary stages as in figure 5.5.

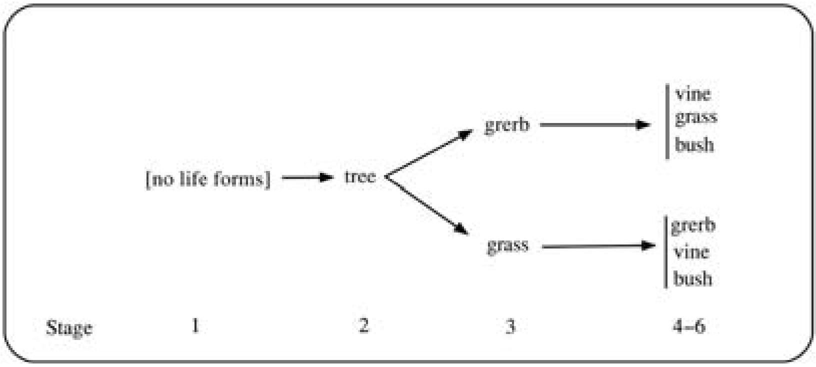

FIGURE 5.5. Plant life form encoding sequence and language stages (after Brown 1984a, 24). The split after "tree" indicates two possible evolutionary paths. When both "grass" and "grerb" are encoded as life forms, "grerb" refers only to nongrass, small herbaceous plants.

Hunn (1982) criticized Brown's characterization of life forms, with their distributional constraints and evolutionary sequence, claiming that the validity of Brown's arguments was impaired because the majority of his life forms were not universal basic terms (in the sense of the basic colors as defined by Berlin and Kay). For Hunn, even classes such as "tree," "shrub," and "herb" were arbitrary placements along a continuous cline and were not, in his view, consistently applied. Hunn and his colleague Robert Randall (in Randall and Hunn 1984) offered a more extended critique, in part on the objection that Brown's data were unreliable, being based to some extent on inexpert dictionary glosses or on information from interviewees whose life form concepts may have been distorted by introduced patterns. In addition, they pointed out, the life forms Brown chose as universal did not correspond to a number of those found in languages they had studied in detail (Sinama of the southern Philippines, Sahaptin of the northwestern United States, and Tzeltal of Chiapas, Mexico) and overlooked utilitarian factors intrinsic to the nature of life forms under their interpretations. Brown (1984b) responded by pointing out that earlier limitations in his data had largely been overcome in his latest (Brown 1984a) formulation and that his hypothesis did not disallow the existence of life forms other than his basic ten. An interpretation of Randall and Hunn's data with more careful reference to his life

form definitions would put them, he said, largely in agreement with his hypothesis.

Another major contribution by Brown (1985) was a very broad-scale review of the folk classification systems of hunter-gatherers versus small-scale agriculturists with respect to numbers of labeled biological classes and numbers of binomial names. He concluded that the foraging groups had smaller total name inventories and that these inventories rarely included binomials. Brown also provided an explanatory framework for these findings. I discuss this work in more detail later in connection with the fit of my data from a nomadic pastoral society.

One of the more persistent issues in folk classification theory has been the discipline-basic question of whether folk classification and nomenclature arise from humans' innate intellectual tendencies to name and arrange the perceived discontinuities in the living natural world or whether these processes reflect the physical or nonphysical cultural *usefulness* of these living kinds and their classifications. The often remarked extreme positions in this polarity are (for the "intellectualists" or "perceptualists") Claude Lévi-Strauss's emphasis on the primacy of intellectual function in his *Savage Mind* (1966) and (for the "utilitarians," "functionalists," or "adaptionists") Bronislaw Malinowski's much-quoted "short road" from the wilderness to the belly and mind of the savage (1948, 27).

Brent Berlin, probably considered the leading theorist in folk classification studies, has long been a strong proponent of the intellectualist position. His 1992 restatement of "general principles" specifies that "ethnobiological systems of classification are based primarily on the affinities that humans observe among the taxa themselves, quite independent of the actual or potential cultural significance of these taxa" (1992, 31). Another of his principles points out that "a substantial majority of ethnobiological taxa will correspond closely in content with taxa recognized independently by Western botany and zoology" (1992, 34). This last statement is linked closely to one of Berlin's main arguments for the nonfunctionalist position: that an often observed close fit between folk and scientific taxa (the latter by rule excluding cultural factors) and the apparent "uselessness" of many folk taxa are evidence for a perceptual rather than a utilitarian basis for ethnobiological classification (Berlin 1992, 80–89). Another advocate of the perceptualist position is Scott Atran, who concludes that "for items that pertain to the conceptual space of human function and use,

then, there may well be 'unclear cases' of category affiliation, but this has no direct relevance to folk biological classification" (1990, 54).

Atran's idea is characteristic of a key distinction often emphasized by the intellectualist school: "general-purpose" versus "special-purpose" classifications as described by Berlin, Breedlove, and Raven (1966, 274–75). Although admitting the empirical fact that some folk classification systems do have taxa based on utilitarian factors, such as edibility, the perceptualists argue that such human functional attributes do not pertain to the "general-purpose" classification of plants but rather to a different "special-purpose" system based on one utilitarian criterion. Such criteria, it is stated or implied, are not as significant to basic classification and should not be confounded with general-purpose attributes.

Brent Berlin, James Boster, and John O'Neill had presented the results of experiments in the bird-naming patterns of the Aguaruna Jívaro (northern Peru), concluding from the results that "classification is primarily determined by the perceptual salience of each species" (1981, 95). Birds rated independently by Western ornithologists as highly salient in a perceptual sense by such factors as size, coloration, and plumage were found to have stable, widely recognized Aguaruna names. The names of those rated as less salient perceptually were characterized by higher variability.

Fieldworkers, meanwhile, were continuing to record folk taxa among both plants and animals that were clearly based on utilitarian factors. Hunn provided an extended and theoretically based reaction to what he saw as continuing neglect of the utility dimension. He argued that folk biological knowledge domains "cannot be adequately understood in such a functional vacuum" (1982, 832) and that a number of empirical findings, such as the existence of "empty" or residual classification space, cannot be accounted for by the strict set theoretical model followed by Berlin, Breedlove, and Raven (1973). Folk classification theory, said Hunn, had become rent by two contradictory models: on the one hand a formal taxonomic hierarchy model and on the other a model that included both "a general purpose biologically natural taxonomic core" and a "periphery" of special-purpose, biologically artificial taxa. The "core–periphery" pattern is superior in explanatory power, he said, and can explicitly recognize the purpose of classification (1982, 830). Extending his discussion to the problem of how to measure and record cultural utility, Hunn suggested that any such approach should be from "the native point of view"

(1982, 840) and based on a working premise that no two folk taxa will be functional equivalents. Each taxon should be defined in terms of a unique "activity signature," which he suggested might consist of a series of imperative sentences giving instruction for action in uses of the taxon being considered.

Brian Morris (1984) supported the utilitarian position in his discussion of folk classification among the Chewa of Malawi with particular focus on their concepts of fungi. Out of a total biological inventory of some five hundred larger fungal species, only about seventy species—those considered edible—participate in a classification with numerous labeled taxa. The remainder, when referred to at all, are simply lumped under a term glossed as "useless organisms" (used also in reference to useless animal taxa). Functional considerations also play a role in Chewa life form classes.

Daniel Clément (1995) argued for a utilitarian approach based on an analysis of Montagnais and Cree (Quebec, Canada) data showing a utilitarian basis for life form classes indicated by linguistic clues.

Brown (1995) examined the question of utilitarian factors in folk classification by focusing on the labels that New World natives gave to seventy-seven nonnative plants, animals, and artifacts introduced by European colonists in both North and South America. The study involved 292 language cases and 196 distinct languages. Brown evaluated each label encoded on the basis of whether it was utilitarian in nature (such as a horse being called *he carries heavy things*) or basically perceptual (such as a horse being referred to as *large tapir*). It was found that only 10 percent of introduced living things had utilitarian names, whereas the proportion of utilitarian names for artifacts was 63 percent. The result was all the more striking in that all the plants and animals involved were domesticated forms specially bred for utilitarian purposes. Brown's conclusion was that these findings largely substantiate the intellectualist view. He also pointed out, however, that some names for introduced plants were utilitarian in more than 30 percent of the language cases, indicating that functional considerations do sometimes play a role in ethnobiological cognition.

With respect to my own position in this debate, I began my investigations of Bedouin Arabic plant classification as an assuming functionalist (a subspecies of ethnobotanist described in, among other sources, Hays 1982, 93), thinking that even if utilitarian factors were not immediately

dominant in my data, they would become so in time with a better understanding of plant names, classification, and uses. My data have finally led me to the conclusion that my consultants' plant classification is built mainly on perceptual criteria. Yet utilitarian features may be evident in a few generic names, and they certainly play a dominant role in one of my Arabic intermediate-rank taxa. I argue against the idea that this folk taxon should be disintegrated from the others as a part of some other "special-purpose" universe. Nor would I deny that considerations of utility might play larger, even overriding, roles in other folk classification systems.

My general approach in the discussion of Bedouin folk classification and nomenclature follows Berlin's (1992) framework and terminology, which have now become something of a standard. I treat my findings largely with respect to how they conform to or vary from his "general principles." Remarks on nomenclature are provided with the discussion of each classification category, proceeding from the most inclusive one, the kingdom, to the least.

5.3.2 Plants as a Kingdom

It is now generally accepted that the single taxon occupying the rank of kingdom is usually unlabeled (Berlin 1992, 27). It does seem to be a fact, however counterintuitive, that the majority of natural languages studied to date (at least their everyday, nonscientific versions) have no name for the categories "plants" or "animals" in general. It is my impression that this is also the case for Bedouin Arabic, although the situation calls for some discussion.

There is a term for "plants" (all kinds of plants in the plant kingdom sense) in both modern written Arabic and in some examples of early classical Arabic: *nabāt,* derived from the root *n b t,* which carries the general semantic field of "sprouting, growing out." The verb form *nabata* can be applied not only to plants but to situations such as the sprouting of human hair. It thus provides a natural base for expressing the idea of "things that grow out of the ground," although *nabāt* is basically a verbal noun rather than a substantive.

There is no question as to the application of this term in modern written Arabic to the plant kingdomwide. Botany is referred to by the term *'ilm an-nabāt,* "the science of plants," obviously all kinds of plants. I would

argue, however, that the semantic field of the term *nabāt* in Qur'anic and some other early classical usage is rather different. In several cases, it seems to be used primarily as a verbal noun in the sense of "plant growth" rather than as a substantive—for example, in "Ka-mathali ghaythin a'jaba al-kuffāra nabātuhu" (Like rain, of which the [plant] growth pleases the tillers) (Qur'an 57:20) and "Ka-mā'in anzalnāhu min as-samā'i fa-akhtalaṭa bihi nabātu-l-arḍi" (Like water that we send down from the sky and that then mingles with the [plant] growth of the earth) (10:24). The term is used as a verb and intensive verbal noun even with reference to the creation of man in 71:17 (my literal translation): "W-allāhu anbatakum min al-arḍi nabātan" (And God caused you to sprout forth from the earth). The close association in the majority of these references of plant growth with rain suggests that they indicate primarily annual plants (or crops) rather than shrubs or trees. It is thus perhaps not surprising that the well-known early philologist al-Aṣma'ī (d. A.D. 831) titled his botanical monograph *Kitāb an-nabāt w-ash-shajar* (The Book of Plants and Trees), as if the term *nabāt* were itself not sufficient to convey the inclusion of woody perennials. It is true that Abū Ḥanīfah ad-Dīnawarī (d. ca. A.D. 895), probably the greatest early writer on plants, called his work simply *Kitāb an-nabāt* (The Book of Plants), but Abū Ḥanīfah can almost be considered an early specialist using the term in a scientific sense.

The renowned historian of Tunis, Ibn Khaldūn (d. A.D. 1406), provided clear examples of both classical Arabic usages of the term *nabāt* in the second chapter of his *Muqaddimah (Prolegomena),* comparing Bedouin and sedentary cultures. First, in a practical description of the pasture needs of the camel, he states: "Li'anna masāriḥa at-tulūli wa nabātahā wa shajarahā lā yastaghnī bihā al-ibalu" (Because the pastures of the hills, and its plants and its shrubs, do not satisfy camels) (Ibn Khaldūn n.d., 121, my translation). Then, a few pages later in a more abstract reflection on created things, he comments: "fal-mukawwanātu min al-ma'dini wan-nabāti wa jamī' al-ḥayawānāti al-insāni wa ghayrihi kā'inatun fāsidatun" (and created things: minerals, plants, and all the animals including humans and others are existing and decaying) (136).

I would thus suggest that the semantic field of the term *nabāt* in nonspecialist, classical Arabic often parallels that of the word *plant* in everyday (nonscientific) English. Anna Wierzbicka argues persuasively that the word *plant* in English folk classification, as opposed to scientific classification,

does not denote “any plant” (in the biological sense) but rather a green, leafy plant smaller than a person and is thus something like a life form (1985, 154–56; 1996, 364). Brown had already recognized the use of the term *plant* in this sense in modern, everyday English (1977, 334; 1984a, 65). He points out that this appears to be true for some less-educated speakers of the language, but that for many speakers the term is polysemous, denoting both the kingdom and the more restricted class (personal communication to the author, 2004).

I used the term *nabāt* occasionally in discussions about plants with nonliterate Bedouins, and they obviously understood it. I never heard them volunteer it or use it among themselves, however, and it appears not to be a part of their active vocabulary. One obvious basis for their understanding of the term is simply its existence as a verbal noun of the verb *nabata,* which I presume does exist in their speech. They might also have heard it in religious leaders’ quotations of the Qur’an or in such recitations that emanate night and day from the radio broadcasting systems of Saudi Arabia and neighboring states or even from radio programs about popular science.

The word ***nabāt*** is found at least occasionally in recent Bedouin poetry. Marcel Kurpershoek’s wonderful compilation of Najdī Bedouin verse provides three examples, two of which are in poems composed by ‘Abd Allah ibn Muḥammad ibn Ḥuzayyim of the Rijbān section of ad-Dawāsir, better known as ‘Abd Allah ad-Dindān. Ad-Dindān (who is illiterate) gives a half-line in a description of camels in which the word *nabāt* is included (transcribed as *nibāt*): *“W-kabbab ḥaṣāyirha nibāt al-marābī‘i”* (And plants of the spring pastures make their sides bulge) (Kurpershoek 1994, 118, italics in original, my literal translation). Again, the word appears in another poem describing a rainstorm:

> *‘Asa illi difag sēlih w-wablih ybārik fīh*
> *nibātih min al-jiddah khazārīf w-anwā‘i*
>
> Would that He who pours out his flood and torrent bless it [all]
> Its new-sprung plants as embellishments, of many kinds.
> (Kurpershoek 1999, 222, italics in original, my modified transliteration and literal translation)

The contexts of these lines suggest that the plants involved are new annuals arising from recent rain rather than plants in general, and in both cases

the term ***nabāt*** may as well be translated as "growth" or "sprouting" of spring pastures or "new growth"—that is, as verbal nouns. The last line may also involve an element of Qur'anic imitation (even if unconscious) because the association of the term *nabāt* with the rather unusual word *zukhruf* occurs in Qur'an 10:24, where from plant growth *(nabāt)* the earth "has taken its adornment [*zukhruf*] and is beautified" as a result of God-sent rain. As Kurpershoek points out, the word ***khaẓārīf*** in this poem is a variant of classical *zakhārīf* (the plural of *zukhruf*). It also seems likely that the poet, whose meter required a stressed syllable at this point in the line, chose the term ***nibāt,*** with its long *ā*, rather than the more common Bedouin term for annual plants, ***'ishb,*** for prosodic reasons.

Another poet using the term ***nabāt*** is Fāliḥ bin Ḥamūd ibn 'Ubayd of the Makhārīm section of ad-Dawāsir, better known as Ibn Batlā'. Blind since boyhood (Kurpershoek 1999, 9), Ibn Batlā' can be presumed nonliterate. One of his poems offers a description of a Bedouin migration following heavy rains:

> *Tanaṣṣaw marāti' dīrtin nabt/ha zāfāt*
> *nibātin zakhārīfih t'īshik nuwāwīrih*
>
> They headed straight for the rich pastures of a land growing flowers
> Plants whose adornments and blossoms will give you life.
> (Kurpershoek 1999, 144, italics in original, my revised transliteration and more literal translation)

The first half-line contains the form ***nabt,*** clearly a verbal noun meaning "growth, sprouting up." Again, the preceding context of heavy rains implies that the term ***nibāt*** refers to new annual plants. Kurpershoek in fact translates the word ***nibāt*** here as "annuals," conceivably after discussing the meaning with the poet himself. Also again, we have the Qur'anic combination of *nabāt* with the term *zukhruf,* this time the plural being in its nontransposed classical form.

The kingdom "plants" is thus most probably unlabeled in Bedouin Arabic, although my consultants understood (in some sense) the word *nabāt,* which is generally used in written Arabic for the plant kingdom. Some Bedouins use this term in poetry, possibly having picked it up from its several occurrences in the Qur'an or from other poetic usage. In the Qur'an

and in some other early written contexts, however, the word *nabāt* appears to connote primarily herbaceous, annual plants rather than all plants in the kingdom sense.

5.3.3 Life Forms

My consultants partitioned their plant world into two strongly contrasting categories that together were inclusive, directly or transitively, of nearly all generics. Exceptions are seven unaffiliated plants of high cultural salience or of atypical morphology, which I discuss later with other generics. These two life form classes are termed ***shajar*** (sing. ***shajarah,*** perennial plants) and ***'ishb*** (sing. ***'ishbah,*** annual plants). I gloss these terms as "perennials" and "annuals" rather than as "woody" and "herbaceous" because consultants who described for me the difference between these two classes did so in terms of seasonal duration, not in terms of stem texture or size. A ***shajarah*** is a ***shajarah*** because ***"mā yiḥtarag fil-gēḍ"***—that is, "it doesn't burn up in the summer time." A ***shajarah*** is ***dāyimah*** ("lasting, continuous"). One consultant added the morphological criterion "it has a big root," referring to the taproot and probably the otherwise extensive root system that is characteristic of many perennial plants. An ***'ishbah,*** in contrast, "burns up," referring to the browning and death (and virtually complete disappearance) of the annuals when the ground dries out after their winter and spring growth. Some researchers (e.g., Brown 1984a, 10) exclude the perennial/annual contrast as a basis for a universal folk life form because it is a "special-purpose" distinction based on a single criterial attribute. This argument may be valid in many environments where life cycle contrasts cut across life forms of greater salience. However, Brown also points out that the encoding of botanical objects through binary opposition is greatly enhanced if a discontinuity in nature is also pertinent and that this is especially true if the discontinuity is underlain by feature clustering (1984a, 101). All of these factors, in fact, are present in the ***shajar/'ishb*** opposition. In the hyperarid environment of our study area, there is a real and highly perceptible discontinuity wherein virtually all plants are either "dry season withstanders" that have evolved morphological or physiological mechanisms enabling them to survive the extremes of summer dryness or "dry season evaders" that surrender their vegetative body completely in exchange for survival as drought-resistant

seeds during the rainless summer. The life cycle contrast is underlain by larger size and woodiness among the perennials and by smaller size and herbaceousness among the annuals. These correlations, although certainly not perfect (as indicated later) do lend added strength to the binary opposition of ***shajar*** versus ***'ishb.***

With respect to the category ***shajar,*** I find that it applies to forms differing as greatly as 10-m-high boled trees and individual tufts of perennial grass. I remember the incredulous look one consultant gave me when I asked whether a tuft of *Stipagrostis* grass was an ***'ishbah*** or a ***shajarah:*** it *obviously* was there and *alive* in midsummer! But differentiation of this broad category is possible through a second life form level, involving use of the term ***shima'*** or (among the northern tribes) its synonym ***gish'.***

All ***shima'*** are considered to be ***shajar,*** but they are constrained in size, being not more than about man high and usually in the range of about 50 to 100 cm. They can be more or less woody shrublets or bushlike perennial grasses. They contrast directly with a third group, also called ***shajar*** but in a more restricted usage of that term (which I here label as ***shajar***$_2$). ***Shajar***$_2$ correspond with what in English are normally called *trees* or *large shrubs.* This polysemous use of the term ***shajar*** became apparent when I was asking consultants about what kinds of ***shajar*** were not ***shima'*** (bushes). They explained by referring to what they called ***"ash-shajar al-'iḏām"*** (the grand, big ***shajar***) and by naming examples of that class ***(shajar***$_2$***): salam*** *(Acacia ehrenbergiana),* ***ṭalḥ*** *(Acacia gerrardii, A. raddiana),* ***sidr*** *(Ziziphus nummularia, Z. spina-christi),* and ***'ōsaj*** *(Lycium shawii).* In ***shajar***$_2$ the quality of "woodiness" as well as size (height higher than a man) are implicit. The category ***shajar***$_2$ refers to only some ten generics, but I cannot conceive of calling it anything but a life form or sublife form. The rather small number of referents in the study area is basically an ecological accident. At least three of my main consultants' tribes have a strong tradition of having migrated from western Arabia, where tree forms (principally *Acacia* spp.) are frequent even in highly arid zones. *Acacia* diversity there, in a scientific sense, is also much greater than in our study area. It is thus not surprising that their speech has maintained ethnobotanical categories useful for dealing with tree forms. There is further evidence of this maintenance in the intermediate category ***iḏāh,*** which I describe later. The situation with respect to life forms in this study is shown in the Venn diagram in figure 5.6.

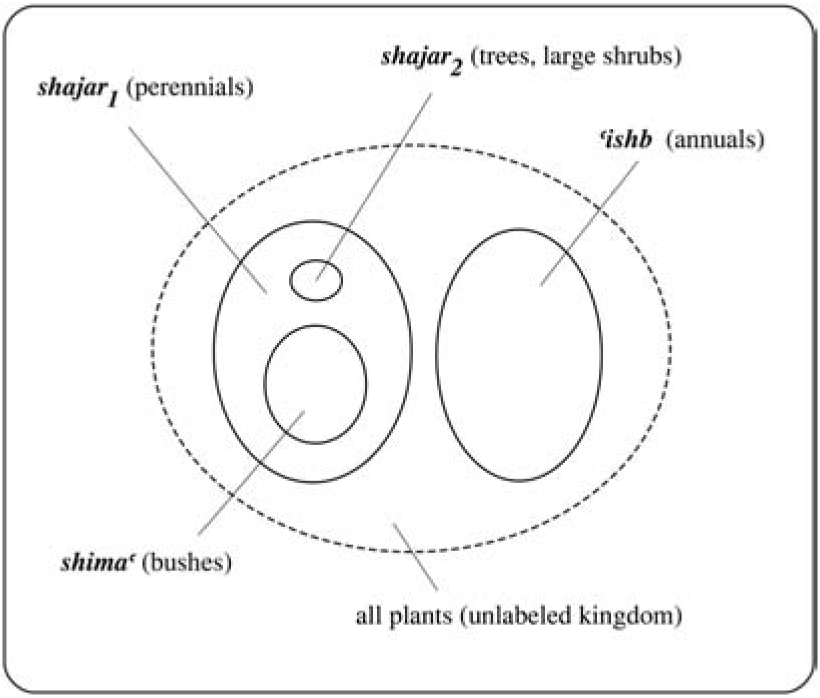

FIGURE 5.6. Bedouin plant life forms.

I consider ***shajar***$_2$, the "grand" ***shajar,*** to be the prototype of ***shajar***$_1$ with its extended sense of "all perennials." ***Shajar***$_2$ are not only the "woodiest of the woody." Because the great majority of them tend to be phreatophytes, they are also the "most perennial of the perennials," being nearly independent of seasonal rainfall and the most resistant to summer drought. Berlin applies the concept of prototypicality primarily to specific/generic relationships, but he also concludes that intermediates can be generated by extension of the semantic ranges of generics (1992, 152). Brown, who has concentrated much attention on the analysis and development of life form categories, gives examples of life forms or even kingdoms arising through extension of less-inclusive classes—for example, the extension of the American everyday sense of "plant" as a group of small, herbaceous taxa to the sense of "all plants," or the plant kingdom (1984a, 65). Randall does not hesitate to carry prototypicality to the life form level (although

he eschews use of the term *life form* in favor of *highly inclusive category*). His basic concept of highly inclusive categories is in fact one in which "attributes are combined to create prototypic (focal, exemplary) categories with ranges (extensions) lacking one or more prototypic attributes" (1987, 143). "Tree or big shrub" ***(shajar*$_2$***)*** in this study thus extends to the broader ***shajar***$_1$ sense, which maintains the attributes of perennation and sometimes some degree of woodiness but lacks the attribute of great size.*

The Bedouin concept of ***"'ishb"*** for the annuals is, by contrast, straightforward. It comprises all (and only) plants that appear as annuals. I say "appear" here because ***'ishb*** includes a few generics that do not grow from seed every year but grow up after rains from a perennating bulb or corm, as in some liliaceous species. Inasmuch as these plants disappear from view completely, losing all above-ground parts during the drying and windy summer period, they maintain no continuing identity and are, in a perceptual sense, also "annuals."

Annual grasses are also simply ***'ishb.*** There is no labeled Bedouin category for grasses as such. My consultants used the term ***ḥashīsh,*** often glossed "grass" in dictionaries of written Arabic or in dialects of settled folk, only in the sense of plant material, often but by no means exclusively true grasses, that is cut by hand for feeding to livestock as supplementary fodder. The word ***ḥashīsh*** is thus more or less equal to the English term *hay* (of a wild sort). The "having been cut" aspect of the term is paramount, and the lexeme is in fact a deverbal from ***ḥashsh*** with the basic meaning of "to cut standing plants." I would mention with respect to this lack of a "grass" term (although I would not claim it to be the only explanation) that for the Bedouins true grasses are not the primary grazing resource that they are in many other pastoral societies and environments. Our study area does not include "grasslands" even of arid type, and the grasses of the area grow as isolated tufts without forming sod. Stands of the grass *Panicum turgidum* are an important pasture type, but these stands appear, even to the Western eye, to be "bushes," just as the Bedouins class them as ***shima'.*** Non-Bedouin village cultivators of the al-Hasā and al-Qaṭīf oases do appear to recognize ***ḥashīsh*** as a utilitarian category but with

*My acceptance of Randall's analysis for ***shajar*** is not, I should add, to imply my agreement with all of his ideas regarding highly inclusive categories. I do not, for example, accept his view about the basic functional (utilitarian) aspect of life forms in a universal sense (although such examples may in fact appear in some systems).

the meaning "weed" or any plant, graminaceous or not, that is undesired in cultivation and that would therefore be "cut" out with a ***maḥashsh,*** the curved, serrated knife they use for such work. The name ***ḥashīsh*** is of course applied also to *Cannabis sativa* (a nongrass) in parts of the Middle East, whence it entered English as *hashish* (*Cannabis,* marijuana).

Bedouin ethnobotanical classification also has no term equivalent to the English category "vines," which exist in the study area as virtually a single generic, the creeping gourd, *Citrullus colocynthis.*

The Bedouin concept of ***'ishb*** (annual plants) is highly significant culturally, as shown, among other ways, in their highly developed oral poetic literature. The term ***'ishb*** is strongly symbolic of the material ideas of ***rabī',*** that brief and often elusive period of milk and plenty resulting from good rains, when the herds feast on green spring herbage. It is also associated with the prized quality called ***khēr,*** connoting the Bedouin ideal of natural bounty, hospitality, and generosity with the lavishing of one's riches upon guests. Annual plants as individuals, however, appear to be *less* salient than individual perennials. This is demonstrated, for example, in the smaller proportion of scientific species labeled among the annuals (62 percent) compared to the number labeled among the perennials (84 percent). Issues of ecological salience, the size factor, and cultural salience according to Hunn's (1999) description are certainly at work here. As Hunn points out, annual plants are temporally restricted and less likely to obtain the cultural recognition afforded perennials of otherwise equal salience (1999, 48). The annuals in this study are also, of course, decidedly smaller, as individuals, than the perennials.

The explanation for this apparent contradiction between cultural significance and lesser perceptual salience, I suggest, lies in the way Bedouins look upon the plant world. They view this domain above all with the eyes of the herdsman, not of the flower picker or herb gatherer. The desert camel keeper sees annual plants primarily en masse because it is their mass that is significant to their grazing value. The species composition of a patch of ephemeral greenery (apart perhaps from the rare presence of a toxic plant) is essentially neutral and of little interest. All of its generic components have about the same nutritional value for livestock, or at least the Bedouins seem to presume this to be the case. It is the lush mass of the annuals, not any generic component, that allows camels to go entirely without drinking throughout a good spring season. Even in a purely perceptual

sense, regarding ***'ishb*** the Bedouin pastoralist's eyes seem to be those of someone on camelback or in a pickup truck, not of someone stooping to examine flowers or leaves. Decisions on moving livestock and the family camp may be made on the presence or density of ***'ishb*** in a given place, but not, as far as I have seen, on the composition of ***'ishb***.

This attitude toward the smaller plant life forms used seasonally may be characteristic of herders in general. After writing the previous paragraph and while scanning through Myrdene Anderson's study of Saami reindeer herders in the Norwegian Arctic, I found the following, strikingly parallel statement regarding Saami attitudes toward the low-growing lichens that are all important for reindeer grazing during the winter:

> Lichens, even the economically important species, generally grow in mixed ground cover with other lichen and non-lichen species. In this context it is impertinent to single out particular segregates, and to remove specimens for closer identification only takes them from substrate and context. Any such handling and close inspection of any small object is unusual; even the herder is not apt to have noticed lichens at closer range than standing or sitting distance.
>
> The choice of forage plant is the reindeer's business; the herder makes sure that there is other than bare rock beneath the snow and takes care of the coarser-grained strategy of management, including considerations of predators and poachers. Herders assert that reindeer eat everything, or that they assume this to be the case. (Anderson 1978, 524–25)

For perennial plants, in contrast, specific species composition is often a deciding factor in the Arabian Bedouins' grazing decisions. Some perennials "have more green" than others, and some are known to provide specific essential nutrients, such as the salt minerals found in the shrub chenopods. It is for all these reasons, I think, that Bedouins are far more likely, probably by a factor of a hundred, to use the inclusive term ***'ishb*** in everyday conversation rather than any of the generic names for annuals. It is also why I question, in my later discussion of generics, whether, with respect (only) to the annuals, generics may *not* be (as is generally assumed elsewhere) the most salient category of Bedouin plant classification.

This is perhaps the place also to mention that Bedouins in our study area generally seemed quite insensitive to the intrinsic beauty of plants.

This insensitivity might of course be characteristic of many other societies that live outdoors and make their livings directly from nature. It does not appear to be the case in the more mesic mountain environment of southwestern Arabia. Tribesmen there (who are mostly settled villagers) may on some occasions be seen wearing twisted wreaths of flowers or leaves on their heads. The aromatic qualities of the plants used seem to be at least as important as the visual effect. Among the lowland Bedouins, plants figure in oral poetry but seem to be used mainly as sources or symbols of "good grazing," "plenty," and satisfied camels rather than as objects of beauty by themselves. A plant generic may be mentioned in poetry but often seemingly just as a handy simile for describing the beauty of something else, as in likening the whiteness of a beloved's teeth to the ray petals of ***gaḥwīyān*** (*Anthemis* spp.) in the way English speakers might say "lily white." (See the accompanying CD for a sound clip of a Bedouin song mentioning a plant.)

All Bedouin life form names are simple primary lexemes, and they all take the pattern of the Arabic *nomen generis,* the special noun form used for virtually all names of wild plants and wild animals found normally in groups. In my view, for reasons also discussed later, these names are essentially unanalyzable.

With respect to Brown's (1977, 1984a, 1984b) evolutionary hypothesis regarding the development of universal life forms, I believe that my data fit his constraints on life form combinations and (after ignoring the anomalous annual/perennial contrast) place Bedouin Arabic in stage 4 of his scheme with the three life forms "tree," "grerb," and "bush." Brown states pointedly that his hypothesis does not deny the possible presence of life forms other than his basic five for plants (1984b, 589), and the Bedouin placement of annual grasses in the "grerb" category and perennial grasses in the "bush" category does not violate, in my view, his basic life form concepts. Furthermore, the historical data presented in chapter 7, describing the Bedouin Arabic plant classification as recorded in literary accounts written a millennium ago, lend support to the actual evolutionary steps postulated by Brown. Those early records included all the Bedouin life forms presently recognized, with the conspicuous exception of ***shima'*** and ***gish'*** or any other term for "bush." It is "bush" that is the theoretical follower of "tree" and "grerb," and in the case here it actually does appear to have been added later than the other two. Brown identifies

six other language cases that fit in the stage 4 "tree, grerb, and bush" classifications (1984a, 174–75). It would be satisfying to find that these cases are all representatives of desert environments similar to that of the Arabian Peninsula, although such ecological agreement is not by any means a requirement in Brown's system. Three of them are in fact languages spoken in the wider Sahel area of northwestern Africa that experiences significant aridity at least seasonally. The other three (Ghana, South Laos, and Puerto Rico) appear not to be ecological matches.

Finally, with respect to life forms, I can offer a tantalizing glimpse of a possible second, alternative Bedouin plant classification at this level among tribes of northern Arabia, including, at least, the Shammar. This classification places a third major life form category, ***aṭ-ṭawālī‘,*** between ***shajar*** (perennials) and ***‘ishb*** (annuals). In this classification, which is based on stem texture as well as on plant duration, ***shajar*** are conceived of as all woody bushes, large shrubs, and trees; ***aṭ-ṭawālī‘*** as nonwoody perennials; and ***‘ishb*** as the annuals. Generics offered to me as good examples of ***aṭ-ṭawālī‘*** were: ***ḥamāṭ*** *(Moltkiopsis ciliata),* ***makar*** *(Polycarpaea repens),* ***karī*** *(Heliotropium digynum),* ***rukhkhāmah*** *(Convolvulus cephalopodus),* ***ramrām*** *(Heliotropium ramosissimum, Heliotropium bacciferum),* ***janbah*** (*Fagonia* spp.), ***thmām*** *(Panicum turgidum),* and ***nuṣī*** *(Stipagrostis plumosa).* The last two indicate that perennial grasses are included. All of these generics are perennial plants with stems that are not or hardly woody. The few consultants I had available to describe this system (the main one was a single Shammarī) did not dispute the basic classification that I portray in this study. They considered their system rather a kind of refinement. Their middle category, ***aṭ-ṭawālī‘,*** is definitely less salient, even in their own usage, than the other two life forms. This assumption is reflected in the grammatical form of the term, which is a "broken plural" rather than the usual plant/animal collective. The lexeme is derived from the root *ṭ l ‘,* associated with the idea (among others) of "growing out, up," and seems to refer to the fact that this class has "grown up" (in the physical, not maturation sense) and become larger than the annuals. When asked for the singular form of ***aṭ-ṭawālī‘,*** consultants hesitated, then gave ***ṭālū‘;*** the plural was clearly the form normally used. Consultants from our core study area and from central Arabia, in tribes such as Banī Hājir, Āl Murrah, and Qaḥṭān, said they did not recognize any such category. For them, the term ***ṭawālī‘*** meant simply "***‘ishb***

that has grown up and gone to seed" or was applied only to "the young shoots that grow out of the base of date palms" (Āl Murrah). In any case, even for the northerners, I would hold this life form interpretation in a strictly provisional basket until data are obtained over a broader base.

5.3.4 Intermediate Categories

Bedouins group part of their ***shajar*** (perennial plants)—the great majority of them being ***shima'*** (bushes)—into two labeled intermediate categories that contrast directly with each other. The first and clearly more salient of these two categories is called ***ḥamḏ,*** with a referential range that in our study area coincides almost perfectly with the scientific plant family, Chenopodiaceae. ***Ḥamḏ*** are what I refer to as the saltbushes, including some twenty-eight folk generics, several of which lead important monospecific shrub communities, whereas others are important constituents of mixed stands. They all are genera highly adapted to the arid environment, and they are characterized not only by the family's inconspicuous, apetalous flowers and often papery winged fruits, but also by highly modified, often succulent or reduced leaf structures. The group slightly cross-cuts with respect to life form in that four annual scientific species of Chenopodiaceae, folk generics classed as ***'ishb,*** are also included.

Close correspondence to a scientific family or to part of one is one of Berlin's general characteristics of intermediate taxa, which he describes as "small numbers of folk generics that show marked perceptual similarities with one another" (1992, 24). Our intermediates are a quasi-exception to his generalization that such taxa are usually unlabeled. Our chenopods do share many perceptual characters, some of which are mentioned in the previous paragraph. I must say I thought it rather amazing, however, that Bedouins place the annual *Atriplex,* with its herbaceous habit and flat "normal" leaf form so different from those of its highly modified relatives, unerringly into the same category.

The Bedouin perception of the unity of ***ḥamḏ,*** however, is in no way a celebration of a Western taxonomic family. It serves, rather, to recognize an all-important aspect of the camel's physiology: its unusual need for salt, probably of more than one kind, to maintain its health and the milk production upon which its herders are dependent (section 4.1). Turning camels out to forage on the plants called ***ḥamḏ*** is the herdsman's way of

ensuring that the need for these essential mineral nutrients is satisfied. Camels also require for optimum health periodic grazing on non***ḥamḏ*** shrublets collectively called ***khillah*** (i.e., nonsaltbushes), although this requirement does not have quite the obligate nature as that for saltbushes.

At this point, I hear remonstrations that by treating ***ḥamḏ*** as an intermediate taxon, I am confusing two different universes, two different classifications: one called *plants* and the other called *grazing types.* I offer the following points to the contrary in response:

1. ***Ḥamḏ*** is said to be a kind of "bush" rather than a more inclusive "pasture type" and to be composed of individually named generics rather than of other kinds of more specific pasture types (although I grant that a pasture type might be *described* by the kinds of plants found in it).
2. My consultants have a clearly different and often used term, ***'afjah,*** meaning "grazing land consisting of ***ḥamḏ*** bushes."
3. The name ***ḥamḏ*** takes the form of the Arabic *nomen generis,* which is used to label plants as well as wild animals, birds, and insects normally found in groups and ethnobiological life forms.
4. Consultants' use of the counting plural ***ḥamaḏāt*** in phrases such as ***as-sab' al-ḥamaḏāt*** ("the seven ***ḥamḏ*** plants," described more fully later) indicate that the group is composed of individual generics and that each of these generics can be referred to by the singular form ***ḥamḏah,*** although the collective form of the label is generally used.

Apart from these considerations, a strict adherent of the "general-purpose" school of folk classification would no doubt object that I am dealing here with a "special-purpose" or utilitarian group of generics and that the group should therefore be excluded or dealt with separately. I affirm the utilitarian basis for the ***ḥamḏ/khillah*** contrast yet feel strongly that it should be described as an integral part of Bedouin classification. Without belaboring the long-standing arguments between the "general-purpose or intellectual" school and the "utilitarian" school, I simply point out here that I am a comfortable functionalist in agreeing with Hunn's view that we "should be guided by the premise that cultural knowledge is adaptive" and that "students of folk biological classification must systematically investigate the practical significance of folk biological knowledge" (1982, 844). And although I would not adopt all of Ellen's more relativist positions, his warning remarks about the downgrading of nonmorphological characters in classifications (1993, 110) are very much

apropos. To do so here, whatever logical conveniences it might provide, would do violence to what I perceive as an integrated Bedouin view of the plant world.

It soon became clear through discussions with my consultants that not all ***ḥamḏ*** plants were perceived to have been created equal with respect to grazing value. There was a pecking order, and certain generics tended to be placed always near the top, although the order varied somewhat from one account to another. Some of this variation was ecologically based: among tribesmen in the far north of our study area, the generic ***rūth*** *(Salsola vermiculata),* for example, was considered the very best ***ḥamḏ*** grazing, but this plant's distribution did not extend at all to our middle or southern parts. There, ***ḏumrān*** *(Traganum nudatum)* seemed to be the favorite or always near the top. This selective aspect was also apparent in an often heard expression that seemed to cut across all tribal lines: references to ***as-sab' al-ḥamaḏāt,*** "the seven ***ḥamḏ*** plants." No one could explain where this expression came from or why there were seven, saying only that "everyone knows about the seven" and "the seven are the most important ones." The expression does not occur in religious literature or tradition as far as I could determine (although the number 7 figures prominently in the Qur'an, with its "seven heavens," "seven gates of hell," "seven hard years," and so on), nor does it seem to be a quote from folk literature, poetic or otherwise. Linguist Bruce Ingham interestingly recorded the expression in one of his transcribed samples of Najdī Arabic. He glosses it, without comment, as "the seven *ḥmuḏāt*" (1997, 58–59). His informant, of the Muṭayr tribe, was describing vegetation in Wādī ar-Rishā', an important wadi in central Arabia that drains the uplands between 'Afīf and ad-Dawādimī. When I asked my consultants to list all the kinds of ***ḥamḏ*** (even sometimes when I asked them for just "the seven"), they invariably came up with some ten to fifteen. ***Rimth*** *(Haloxylon salicornicum)* almost always headed the list, probably because it is the most familiar, widespread, and commonly encountered ***ḥamḏ*** generic. It is usually followed by the two or three generics considered to be best for camels. The lists vary by geographical area, probably mainly because some ***ḥamḏ*** generics are not found in all regions or are more prevalent in others. Table 5.1 is my construction of three "sevens," based on the frequency patterns in oral lists provided by consultants from tribes that live primarily in the areas indicated.

TABLE 5.1. "The seven ***ḥamḏ*** plants"

Northern Arabia	Central East Arabia	The Rub‘ al-Khālī
rimth	***rimth***	***rimth***
rūth	***ḏumrān***	***ḥādh***
ḏumrān	***‘arād***	***ghaḏā***
‘ujram	***shinān***	***‘arād***
‘arād	***ghaḏā***	***harm***
ghaḏā	***suwwād***	***ḏumrān***
shinān	***harm***	***shinān***

The category ***ḥamḏ*** also has within it a labeled "junk group," comprising a series of highly succulent chenopods, obligate halophytes found only in salt marsh habitats along the coast or along the inner margins of inland salt flats. These plants are not considered good grazing for camels because they are thought less nutritious and because their consumption leads to excessive scouring. Consultants belonging to the Banī Hājir and Banī Khālid, whose ranges include littoral habitats, grouped these plants into a category referred to by the term ***ṭahāmīj,*** which is normally used in its plural form but has the singular ***ṭihmāj.*** The name appears to be related to a generic synonym, ***ṭaḥmā,*** which Ruwalah and Shammar consultants use for the succulent saltbush *Suaeda vermiculata* (which indeed fits the broader category, although I consistently recorded ***ṭahāmīj*** with *h* rather than *ḥ*). A consultant of the Hutaym tribe of far northwestern Arabia also used the form ***ṭahāmīj,*** in the sense followed by Banī Hājir and Banī Khālid. Āl Murrah consultants said they did not use it in that way. A Sharārī, also of the northwest, preferred the name ***ghardag*** (a name used nearer our primary study area for a specific shrub of saline habitat) for the same group. He used the name ***hōr*** for salt marsh plants in general, including ***ghardag*** and several non***ḥamḏ*** generics. Generics listed by several eastern consultants as examples of ***ṭahāmīj*** include: ***haṭallas*** (*Bienertia cycloptera,* fig. CD.94), ***khirrēz*** *(Halopeplis perfoliata),* ***shū‘*** *(Arthrocnemum macrostachyum),* ***thillēth*** (*Halcocnemum strobilaceum,* fig. CD.187), and ***suwwād*** (*Suaeda vermiculata,* fig. CD.316). The generic ***suwwād*** also appears in some lists of "good" ***ḥamḏ*** plants. I rank the taxon ***ṭahāmīj*** as a "subintermediate" group. It is decidedly less salient than ***ḥamḏ,*** a fact perhaps reflected in the name's taking the form of the Arabic "broken

plural" rather than the form of the collective noun used for the majority of plant generics and more inclusive categories.

As already pointed out, the category ***ḥamḏ*** maps closely on the scientific plant family Chenopodiaceae. The fit, however, is not quite perfect. The most conspicuous exceptions are the zygophyllaceous generics ***harm*** (*Zygophyllum qatarense,* fig. CD.334; *Z. mandavillei,* fig. CD.333) and ***garmal*** (*Zygophyllum simplex,* fig. CD.335), the first sometimes even figuring in lists of "the seven ***ḥamḏ*** plants." The acceptance of ***harm*** and ***garmal*** as kinds of ***ḥamḏ*** is easily understandable on grounds of morphology and habitat. ***Harm*** is often found in saline terrain, as are other ***ḥamḏ*** generics, and it is the only widespread and common nonchenopod shrub with highly succulent foliage. In terms of succulence, in fact, it is even more ***ḥamḏ***-like than many chenopods. It has petalous flowers, but they are very inconspicuous. Its sap has a salty taste, and, like its saltbush companions, it is probably a mineral supplier for livestock. ***Garmal,*** a smaller, low-growing *Zygophyllum,* is not frequently seen in our core study area, but it shares the same morphological and probably physiological features. The only other family exceptions among the ***ḥamḏ*** perennials are ***gurm,*** the coastal mangrove *Avicennia marina* (Verbenaceae), and ***gaṭaf,*** two small species of *Limonium* (Plumbaginaceae), also of coastal salt marsh habitat. Both of these generics are known only to tribes that range to the coast; they are treated as ***ḥamḏ*** on the basis of their saline habitat, perhaps also for some grazing characteristics, but they are seldom volunteered as examples of that class. A Banī Hājir consultant referred to them as ***ḥamḏ al-baḥr,*** "***ḥamḏ*** of the sea."

The category ***ḥamḏ*** (as mentioned earlier and as indicated in fig. 5.7) is to a slight degree cross-cutting into the life form ***'ishb***, the annual plants. Of the very few annuals that are considered to be kinds of ***ḥamḏ,*** both ***rghēlah*** (*Atriplex dimorphostegia,* fig. CD.91) and ***gṭēnah*** (two species of *Bassia,* fig. CD.93), are chenopods. The second has a synonym, ***ḥmēḏ*** or ***ḥmēḏah,*** which is simply a diminutive of ***ḥamḏ,*** thus "little ***ḥamḏ.***" The only annual ***ḥamḏ*** exception with respect to scientific family is ***millēḥ,*** a small aizoaceous annual (*Aizoon hispanicum,* fig. CD.53), a papillose succulent herb often of saline habitat. Its generic name is from the word for salt, ***milḥ,*** and it is its "salty" nature that doubtless leads to its consideration as a kind of ***ḥamḏ.***

With respect to nomenclature, ***ḥamḏ*** is a simple lexeme with some degree of semantic transparency. It is closely related to the root *ḥ m ḏ,* denoting the idea of "sourness" (a sour-tasting thing is said to be ***"ḥāmiḏ"***). That root figures in the names of at least one non***ḥamḏ***, annual: ***ḥummēḏ*** or ***ḥammāḏ*** for *Rumex vesicarius,* a dock that does have a very acidic taste. The ***ḥamḏ*** group does not have a sour taste in the traditional acidic sense. To me, their taste is salty-bitter. I recall, however, a consultant saying that ***ḥamḏ*** bushes taste ***"ḥāmiḏ,"*** and that taste term may well include saltiness in its extended range.

The category that contrasts directly with ***ḥamḏ*** is ***khillah.*** The latter category is basically a residual slot to which bushes that are *not* ***ḥamḏ*** are assigned. ***Khillah*** is said to be ***"ḥalwah,"*** sweet, as opposed to ***"ḥamḏ"***—that is, ***"ḥāmiḏ"*** or ***"māliḥ,"*** salty. The ***ḥamḏ/khillah*** contrast (like the annual/perennial dichotomy of life forms) expresses another bipolar Bedouin view of plant types, in this case along a dimension of salinity important to decisions in camel grazing. Consultants repeatedly and independently made statements along the following lines: "***Hamḏ*** are the following bushes: [a detailed list, by generic name, of many of the ***ḥamḏ*** plants given here]. All the rest are ***khillah***." Yet when I questioned them more closely, it became apparent that significant numbers of non***ḥamḏ*** ***shajar*** could *not* be grouped with the ***khillah.*** True trees and the largest shrubs ***(shajar$_2$)*** cannot be ***khillah,*** nor are any perennials (of any size) that are not palatable to livestock, such as ***'ushar*** (*Calotropis procera,* fig. CD.106) or ***ḥarmal*** (*Rhazya stricta,* fig. CD.276). In our study area, ***'arfaj*** (the composite shrublet *Rhanterium epapposum,* fig. CD.274) is always given as the prime example of ***khillah.*** Also prominent among ***khillah*** examples is ***thmām,*** the perennial grass *Panicum turgidum* (fig. CD.8), which grows in shrublet form. Both of these plants lead important and widespread nonsaltbush plant communities important for grazing.

The essential nature of ***khillah*** is somewhat problematic: unlike the case with the term ***ḥamḏ,*** which clearly labels a group of bush-form generics, the term ***khillah*** sometimes takes on the aspects of a name for a pasture type rather than for a group of plant generics. Consultants will say, "Plant X is (or is not) a kind of ***khillah***." But they will also sometimes say, "***Khillah*** is *land* with no ***ḥamḏ*** growing in it" (my emphasis). The apparent direct contrast sometimes of ***ḥamḏ*** (as an intermediate rank

plant category) and ***khillah*** (when it is considered to be a pasture type) is to some extent illogical but nevertheless seems to exist.

With respect to nomenclatural features, the name ***khillah*** is rather opaque semantically, although I would note the surprising fact that the general Arabic word for "vinegar" (which seems closer to ***ḥamḍ*** in its sense of "sourness") is *khall,* associated with the same root as the term ***khillah***. Arabic does have a number of adjectives that can have self-contradictory, directly opposite meanings. The term ***khillah,*** having the ***-ah*** termination in both the plural and the singular, appears not to be a collective noun of the type used generally for plant names, as is the term ***ḥamḍ***. Consultants also supplied another plural, ***khilal*** (which I never heard used spontaneously).

The only other labeled Bedouin suprageneric category that I would formally call an intermediate is ***'iḍāh*** (for which consultants gave a counting plural ***'aḍī***). It comprises those members of the ***shajar***$_2$ (large shrubs and trees) that have conspicuous spines. This group has a focus on the genus *Acacia,* of which all our members are strongly spinous, but it also extends to the spiny rhamnaceous shrub ***sidr*** (*Ziziphus nummularia,* figs. CD.330, CD.331). A consultant of Āl Murrah recognized this category but used also a term with similar content, ***ṭirf.*** He defined this category as "all thorny big ***shajar*** that livestock eat." All his examples were *Acacia*s, and further study might reveal that ***ṭirf*** is in fact a valid synonymous intermediate focused on the genus *Acacia.* 'Awāzim tribesmen gave me the name ***ṭirf*** for *Prosopis koelziana* (figs. CD.267, CD.268), which morphologically closely resembles an *Acacia.* I tend to consider ***'iḍāh*** a sort of relict category that was probably much more important to the ancestors of several of our tribes that have migrated from western Arabia, where *Acacias* are a very important component of the vegetation. It is a seldom used and not very salient term in our virtually treeless study area.

There are a few other labeled Bedouin generic clusters that I do not consider well enough defined to be called intermediates but that give evidence of more-inclusive concepts. One of them was called ***ḥawārr al-'ishb,*** literally "the hot [ones of the] annuals." This name did not appear spontaneously in speech but arose after I had read of a class called *aḥrār al-baql* (meaning the "pure" or "genuine" herbs) in early classical Arabic botanical literature. I asked consultants if they had ever heard of anything called "the *aḥrār,*" and they replied no but volunteered ***"ḥawārr al-'ishb"***

(***ḥawārr*** being of the same linguistic root but of different meaning). From the examples they offered of such plants, it appeared that the term *hot* was being used in two different senses. It applied to cruciferous plants that had a literally "hot" (mustardy, peppery) taste, including ***khzāmā*** *(Horwoodia dicksoniae),* ***shgārā*** (*Matthiola* spp.), and ***ṣiffār*** *(Schimpera arabica).* The term *hot* was also applied to some plants, such as the thistle ***marār*** *(Centaurea pseudosinaica),* in a more metaphorical sense, much like the "hot"/"cold" characterization of food in some societies. Different date cultivars are so classed among settled Arabs of the oases. In the case of ***marār,*** the idea of "hot" seemed to be associated with its bitter tainting of the milk of camels that feed on it. Other composites that a Marrī consultant placed among the ***ḥawārr*** included a lactiferous *Launaea,* ***'aḏ̣īd;*** the wild marigold ***ḥanwah*** (*Calendula tripterocarpa,* considered toxic to livestock); and ***nigd*** *(Anvillea).*

I also found some evidence for another, more interesting, suprageneric cluster involving several generics that I describe formally as nonaffiliated. While discussing with a consultant of the Banī Hājir tribe whether certain anomalous generics could be considered to be kinds of ***'ishb,*** I found him referring to a group including truffles and all of our other fungi and root parasites by the term ***al-fiṭrīyāt,*** literally "those that break (or split) [the earth]." He explained that this group grew in an unusual way: they all appeared suddenly—sometimes seemingly overnight—by cracking their way through the earth after a good rain without going through a slower growth stage in the manner of other plants. This discussion, unfortunately, took place when I was no longer in reach of other consultants, and I have no other evidence of use of the term or of a complex with similar components. I did, however, find a remarkably parallel statement in *The Book of Plants* by the ninth-century A.D. botanist and lexicographer Abū Ḥanīfah ad-Dīnawarī (see chapter 7). Abū Ḥanīfah quotes a lexical consultant of Bedouin background as saying that truffles, the *'arājīn* (edible club mushrooms), the *dhānīn* (corresponding to today's ***dhānūn*** and ***dhnūn,*** the root parasites *Cistanche* and *Orobanche*), the *ṭarāthīth* (the root parasite *Cynomorium*), and several kinds of apparent fungi were all called *fuqū'* because "the earth cracks open from them and they are without root, green herbage, or fruits" (Lewin 1974, 74, my translation). The term *fuqū'* is a plural form of the name *faq'* (Bedouin ***fag'***) applied today to the desert truffles. It derives from the root *f q ',* with a basic sense of "to crack,

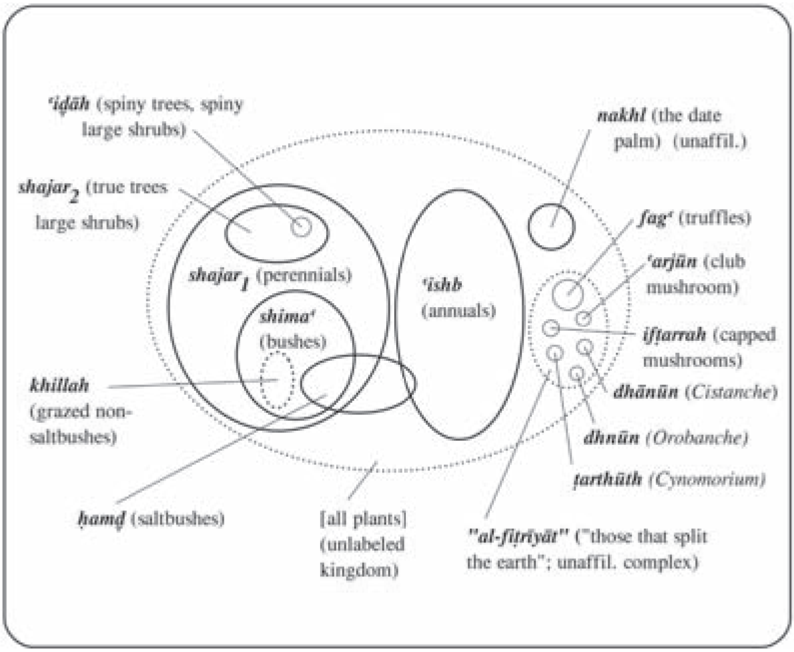

FIGURE 5.7. Bedouin life forms, intermediates, and unaffiliated generics. Unaffiliated generics are described in section 5.3.5, "Folk Generics and Subgenerics." Categories bounded by the dotted line are of lesser salience.

burst open," and is thus a close synonym for the name ***al-fiṭrīyāt.*** If I had more evidence for such a conceptual grouping existing today, I would be tempted to call ***al-fiṭrīyāt*** a life form, either covert (Waddy 1988, 1:88; Berlin 1992, 175–76) or at least "incipient" given more evidence for broader use of the name. As things stand, I refer to it simply as an "unaffiliated cluster" and diagram it with a dotted outline as in figure 5.7.

5.3.5 Folk Generics and Subgenerics

It is now widely accepted that the folk generic represents the most salient category of ethnobiological classification, both psychologically and linguistically. My experience is that this is true of part of the Bedouin Arabic data set, comprising those generics included in the primary life form category ***shajar***$_1$ (perennial plants), but that it is to some extent questionable

with respect to the annuals. This appeared to be the case whether my consultants were speaking in general-purpose terms or with respect to a special kind of plant use, such as livestock grazing (if such a distinction for them is really possible at all). I discussed this situation at more length in section 5.3.3.

In the core study area, generics number about 231, excluding synonyms. They, with their subgenerics, label about 291 (73 percent) of the approximately 400 scientific species occurring in the core study area. The scientific flora of our study area is defined as all uncultivated species in Mandaville 1990, with the exception of those found exclusively outside the normal Bedouin habitat. Such exclusions include weeds of cultivation and ruderals or opportunists found only in villages and towns. The Bedouin floral universe also includes fungi not covered in Mandaville 1990, which deals only with vascular plants. I have also added one genus *(Ferula)* that does not occur in the geographical coverage of Mandaville 1990, the primary study area here, but that is important culturally to some northern tribes.

Given the restricted species diversity of the hyperarid habitat, with a high proportion of locally monotypic genera, it is not surprising that a large number (182 out of 231, or 79 percent) of the folk generics corresponds to scientific species. The remainder, 49, or 21 percent, correspond to more than one species. A few (3 of 231, or 1.3 percent) correspond to more than one scientific genera of a family. This last group comprises the following generics: ***ḥurbuth*** (northern synonym ***gaf'ā***), which includes at least four genera of annual legumes, all sharing papilionaceous flowers, compound leaves, and a fruit form more or less corresponding to a common "bean pod"; ***ṣmēmā,*** which applies to several genera of small annual grasses; and ***kaḥal*** or ***kḥīl*** or ***kaḥlā,*** referring to two genera of boraginaceous herbs with red-staining roots.

All but seven generics are immediately included in more inclusive categories, the seven unaffiliated ones being ***nakhl*** (the date palm), ***fag'*** (desert truffles), ***'arjūn*** (the club-shaped mushroom *Podaxis*), ***ifṭarrah*** (capped mushrooms), and three flowering root parasites: ***dhānūn, dhnūn,*** and ***ṭarthūth.*** There is some evidence, as described in the preceding section dealing with intermediate taxa, that of these generics all but ***nakhl*** may figure in a conceptual complex, itself unaffiliated to our formal life forms, but for which data are still sparse. Whatever the case, all of these

seven generics exhibit Berlin's two generalized characteristics of nonaffiliates: economic importance or unusual morphology (1992, 23–24). The date palm and desert truffles (the latter as a highly valued wild delicacy) are two of the more important food plants in Bedouin life. Truffles are also unique in being nongreen, growing underground, and not being eaten by livestock. *Podaxis* and the capped mushrooms are not important as food plants, but they, like truffles, exhibit unusual, nongreen morphology, as do the flowering root parasites.

Bedouin Arabic generics are overwhelmingly monotypic, the only exceptions being three taxa of special cultural salience: ***nakhl*** (the date palm), ***fag'*** (desert truffles), and ***samḥ*** (*Mesembryanthemum* spp. and an *Aizoon* with edible seeds), plus one marginal case ***(ḥurbuth).*** Bedouins recognize and label at least five folk specifics for dates (I say "dates" rather than "date palms" because, as noted in the generic list, this recognition is based on fruit forms) and four to five specifics for truffles. ***Samḥ*** includes three specifics, one of which is a type specific. I found no evidence among my consultants for the existence of any folk varietals.

The unique morphology of the ***fag'*** group, desert truffles, along with its unaffiliated status, raises the question as to whether it should be classed as a generic with included specifics or a life form including several generics. Truffles do exhibit a unique life form, but I feel they are better treated as a generic in view of the small number of labeled taxa they include as well as my subjective impression of the Bedouin use of the term ***fag',*** which seemed to be in contrast with other plant names at the generic, not the life form, level.

The only other generic exhibiting any tendency toward polytypy is ***ḥurbuth,*** referring to some eleven biological species of small annual legumes, most of them of the genus *Astragalus,* of the sort sometimes grouped in English as "vetches." They all have papilionaceous flowers, more or less linear fruit pods, and often compound leaves. Given that these species range over four scientific genera, a tendency toward splitting is perhaps not surprising; ***ḥurbuth*** might be ripe for differentiation. I recorded for one of its members (*Astragalus annularis,* fig. CD.78) the name ***abū khawātīm.*** This name refers, as does the scientific epithet, to the unusual ringlike form of this little vetch's flattened fruits. My consultants would thus describe it as "the kind of ***ḥurbuth*** that has flat, ring-shaped pods." The other scientific species included in ***ḥurbuth*** have no folk labels, each

being referred to simply as "***ḥurbuth***." The situation here is essentially that of Hunn's Tzeltal butterflies, where a generic corresponding to adult Macrolepidoptera including perhaps "several thousand" scientific species has only five labeled subgenerics, leaving a huge residual number of them specifically unnamed (1977, 280–81). Berlin has counseled persuasively against portraying the members of such a residuum in a way that implies they are conceptually grouped on the basis of some affinity or relationship that may well not exist (1992, 114–17). In our case, for example, one might logically be tempted to contrast the labeled plant ***abū khawātīm*** (having flat, ringed pods) with a hypothetical residual category conceived as "those ***ḥurbuth***s that do *not* have flat, ringed pods." The latter are more likely, however, to be viewed individually, even if unlabeled, on the basis of each one's special characteristics. There is perhaps some evidence for this in the existence, among more northern tribes in Kuwait, of a name for another kind of ***ḥurbuth,*** *Hippocrepis bicontorta* (figs. CD.205, CD.206). This name is ***umm al-grēn***, "mother of the little horn" (Dickson 1955, 50), referring to a fruit form anomalous in a different way. I do not take the tempting step here of making ***umm al-grēn*** a folk specific along with ***abū khawātīm*** within a generic ***ḥurbuth,*** mainly because Dickson's informants apparently use a different term ***(gaf'ā)*** for ***ḥurbuth,*** and it is not known whether the category ***gaf'ā*** is inclusive of ***umm al-grēn.*** As noted in chapter 6, Musil also provides generic-level names for this plant in northwestern Arabia.

I thus follow Berlin's lead (1992, 117) in diagramming the situation in our study area as in figure 5.8.

The rank assignment of ***ḥurbuth*** is problematic. It might be considered a generic including one labeled specific ***(abū khawātīm)*** and an unlabeled residual group in the manner of Hunn's butterflies, although those have more than one labeled subcategory, or it might be treated as a labeled suprageneric complex having one labeled generic ***(abū khawātīm)*** and again an unlabeled residuum. It might also be considered a labeled intermediate; it in fact has one often accepted characteristic of an intermediate: clear correspondence with part of a biological family (Berlin 1992, 143). Brown's (1987) proposal for a new rank called the *folk subgenus* (the subgeneric being monomially labeled and immediately included in a generic) does not, I feel, solve the problem, although I would agree that this proposed term gives a good feel for the apparent salience of ***abū khawātīm.***

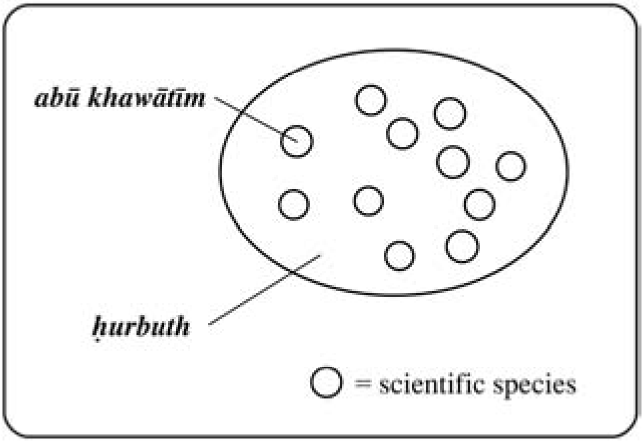

FIGURE 5.8. Composition of the generic ***ḥurbuth.*** One scientific species is named; the others constitute an unlabeled residuum.

I place the label ***ḥurbuth*** among our generics, mainly on the basis of how I see it used in contrast with other names of that rank.

Regarding the nomenclature of generics and subgenerics (for which I include all recorded synonyms in data counts), Bedouin Arabic generics exhibit a very high proportion of simple primary lexemes. Only twelve generic names are complex, and they fall into three groups:

1. Productives. These names have as one constituent the name of the superordinate category to which the generic belongs. The three examples I have consist of the life form name followed by the name of an animal or bird, the two linked in the Arabic grammatical relationship technically called the "construct form." The name ***shajarat an-na'ām,*** literally "bush of the ostrich," glossed "ostrich bush," is used for the leguminous shrublet *Psoralea plicata.* Consultants said that before ostriches were hunted to extinction in the Arabian Peninsula by the 1930s, the birds liked to eat this shrublet. Names of this category may be, at least indirectly, utilitarian. Marking a favorite food plant of the ostrich would be of rather obvious utility to its hunters. Another example is the leguminous shrublet *Cassia italica,* called ***shajarat ad-dābb,*** "snake bush," which has nothing "snaky" about it in appearance or as a habitat. It is, however, one of the few plants poisonous to livestock just as snakes in general are considered

by the Bedouins to be poisonous to man, and I would suggest that the name might thus have a mnemonic and warning function. Overall, judging from the examples provided by Musil (1928a), names of this category appear to be more frequent among tribes of northern Arabia than among groups of my study area heartland.

2. Nonproductives starting with ***abū** or **umm.*** The three cases here are forms consisting of a noun or verbal noun preceded by ***abū*** (father [of]) or ***umm*** (mother [of]). Such constructions, in particular the ***abū*** form, are commonly used in Arabic (and not only in Bedouin speech) to express the idea of a thing possessing the characteristics of something else, much in the fashion of the English suffix *-like.* For example, the name for the rough-surfaced annual *Galium certatopodum,* ***abū nashr*** (fig. CD.183), literally means "father of sawing," which I gloss "sawlike wort" or simply "sawwort." The reference is to the minute scabrous projections on the plant's epidermis, which catch one's fingers in the manner of a fine saw blade. I would note that these constructions are quite distinct from the tendency of informants in many societies to indicate conceptual relations between different ethnobiological taxa, often at the level of generics, through the use of terms expressing human family relationships (Berlin 1992, 145). In ethnobotany, such expressions take the form of "plant X is the brother (or father, mother, sister) of plant(s) Y." I have one example of such a usage in Bedouin Arabic: a Banī Hājir elder's reference to the perennial grass ***thēmūm*** *(Pennisetum divisum)* as the ***ukht*** (sister) of ***thmām*** *(Panicum turgidum),* another grass of shrubby habit. I will not resist mentioning yet another Arabic general speech metaphor form using a parental term with rather different semantic effect: ***umm*** (mother [of]) + a plural noun, which denotes a particularly large or important example of the thing concerned. Thus, we have the phrase *umm al-ma'ārik,* "the mother of [all] battles," which was of course the late Iraqi president Saddam Hussein's prediction for the hostilities of the Gulf War.

3. Other nonproductive noun phrases. These phrases are descriptive of the plant concerned with respect to physical characteristics or to ecological relations. All six cases I have noted, like the productive lexemes, involve the name of an animal or bird. For example, the name ***mishṭ adh-dhīb,*** "wolf's comb," is used for the spinous perennial legume *Astragalus sieberi* (figs. CD.85, CD.86). The plant's spines do resemble the teeth of a comb, but my consultants had no explanation for the association with the

TABLE 5.2. Bedouin polytypic folk generics

Generic	***nakhl*** (date palm)	***fag‘*** (truffles)	***samḥ*** (edible seeds)
Specific	***khlāṣ***	***khlāṣ***	***samḥ (ḥurr)***
Specific	***hshēyishī***	***zbēdī***	***ḥamar wāgif***
Specific	***ḥalwah***	***jbēy***	***da‘ā‘***
Specific	***khnēzī***	***hbērī***	
Specific	***rzēz***	***blūkh***	

Note: Bedouin specifics are in appearance primary lexemes. The presence of the adjectival suffix ***-ī*** as well as the name elements ***khlāṣ*** (pure, genuine) and ***ḥurr*** (noble, genuine) indicate that some of them are functioning as abbreviated secondaries.

wolf, although one might speculate about the "savage" qualities of wolves' teeth and plant spines. And the name ***liḥyat at-tēs,*** "goat's beard," for the annual composite *Koelpinia linearis* (fig. CD.217) is obviously descriptive of the plant's fascicled and finely linear leaves.

All Bedouin folk specific names (table 5.2) take the appearance of primary lexemes. Completely labeled binomial secondary names are totally absent in my data. This absence is of course unusual, considering the prevailing use of secondary lexemes for the specific rank in other folk biological systems (Berlin 1992, 29). The Bedouin specific name sets, however, do fall in Berlin's two situations in which such exceptions have been found to occur in other languages (1992, 29–30): (1) generic-specific polysemy involving a prototypical relationship, and (2) cases where the plants concerned are of major cultural importance. The generic ***samḥ*** fits both of these classes. It includes two species of *Mesembryanthemum* and one species of *Aizoon,* all of which produce edible seeds. These plants have historically been one of the two most important Bedouin wild food sources in northern Arabia.

The generic ***samḥ*** is polysemous with the largest and most important of its three specifics, *Mesembryanthemum forsskalei* (fig. CD.237), which is the clear prototype. Of the two other specifics, one is labeled with a simple primary lexeme, ***da‘ā‘*** (*Aizoon canariense,* fig. CD.52), the other with a complex lexeme, ***ḥamar wāgif*** (*Mesembryanthemum nodiflorum,* fig. CD.239). As is commonly the case in other languages (Berlin 1992, 29), an adjective with the meaning of "real, genuine" is added to the prototype in situations where it is compared directly with its sister specifics.

With ***samḥ,*** this adjective is ***ḥurr,*** which means "noble" or "genuine" (as well as "free"). Thus, discussing contrasts at the specific level, a Bedouin will use the term ***samḥ ḥurr*** or, more commonly, simply ***al-ḥurr*** (the pure, real one) to single out *M. forsskalei,* the prototype.

Our other two generics that include specifics labeled by lexemes of primary appearance, ***nakhl*** and ***fagʿ,*** do not involve polysemy, but they clearly can be classed as highly salient culturally. In addition, many of their specifics—six of ten, a proportion that would be much greater if the large number of other specifics of ***nakhl*** were added in—share a significant feature: they are clearly adjectivals of forms not seen in any other of our names at any rank. Thus, four of them carry the suffix ***-ī,*** indicating the *nisbah,* or Arabic relative adjective, which can carry a meaning similar to the English suffix *-like* or to "a member of." One specific in each of the two consists of the adjective ***khlāṣ,*** meaning "pure, unmixed, genuine," and corresponds to the epithet *genuine* often attached to prototypical folk specifics. Many in fact consider the ***khlāṣ*** date to be the best date cultivar in eastern Saudi Arabia. With respect to truffles, my experience is that the large, whitish ***zbēdī*** may be the most highly regarded, although in the mnemonic verse about truffles (section 4.3) it is the ***khlāṣī*** that the finder keeps for himself! In any case, the use of such forms suggests that although these specifics are primary lexemes in appearance, they are in fact conceptually secondaries, with the generic terms of the binomials assumed. Thus, when a Bedouin uses the term ***zbēdī,*** he and his listeners have in mind "[***al-fagʿ***] ***az-zbēdī***" (the ***fagʿ*** that is white like butter); when he uses the name ***khlāṣ,*** he has in mind "[***al-fagʿ***] ***al-khlāṣ***" (the true, best kind of ***fagʿ***). I would suggest, therefore, that such forms are in fact abbreviated secondary lexemes. The abbreviation of secondary names has been recognized elsewhere (Conklin [1962] 1967, 122; Berlin 1992, 29). Thomas Headland presents a similar interpretation as one of the hypotheses offered to explain the dearth of secondary names for folk specifics among the Agta, a hunter-gatherer group in the Philippines. There, he suggests, because of Agta adjectives' ability to serve as nouns, originally binomial names became truncated to the bare epithet, which then served as the formal name of the specifics (1983, 114–15). In the Bedouin Arabic lexicon, the adjectival forms in such abbreviations tend to be unique either in grammatical form or semantic content and thus act as "tip-offs" to their basically secondary nature.

5.3.6 Some Linguistic Aspects of Plant Names

Bedouin plant names of generic and subgeneric rank may take a number of common Arabic noun forms. Overall, however, they display some unusual characteristics. First, those that are simple primary lexemes (they are the great majority) are generally treated grammatically as the Arabic *nomen generis* (to use the Latin jargon of the nineteenth-century Western Arabists), a kind of collective used in Arabic for the names of wild animals, including birds and insects, which are normally found in groups of large numbers, herds or flocks. The collective form is used also for the names of plants that, when they take the form of simple primary lexemes, also seem to be accepted as "social" or "group" forms of wildlife. The same form is used also for some other classes of natural objects, including stones and metals. These collectives are fundamentally different from plurals in that they represent not a number of individuals but rather an abstract notion of their referent as a "kind," all members of which share a common essence. The form denoting single individuals of these "kinds" technically is not formally referred to by the classical (or modern Western) Arabic grammarians as a "singular," but by the special term *unitative.* (For convenience, inasmuch as both the terms *singulars* and *unitatives* refer to specific, single individuals, in other parts of this study I use *singular* to refer to individuals of both the common plurals and the collective.)

The collective is not marked morphologically and may take various Arabic noun patterns. The unitative, however, is regularly marked by the feminine singular suffix ***-ah*** added to the collective term. Thus, the word *ḥamām,* "dove, pigeon," refers to a "kind" of bird, and *ḥamāmah* to a single, individual dove. The term ***'arfaj*** refers to a kind of shrublet *(Rhanterium epapposum),* and ***'arfajah*** to an individual shrublet of that kind. The investigator's test for the presence of the collective is thus to ask the consultant for "the name for just one" of the generic concerned. Virtually the only simple primary names that do not follow the common collective/unitative pattern are some that take the singular suffix ***-ah*** in both the singular and the plural, such as ***'uwēnah, rubaḥlah,*** and ***ḥanwah.***

Plant names in the form of complex lexemes do not belong to this class. In the name ***mishṭ adh-dhīb,*** "comb of the wolf," "wolf's comb," for *Astragalus seiberi, comb* is not a collective noun, and, in any case, we are

not talking about combs here. In such a case, the singular form of the name is the same as the name of the general "kind."

Virtually all Arabic ethnobotanical categories above the generic rank also are collective nouns. When they occur in productive complex lexemes, they take the form of the *unitative,* not the *collective,* presumably because a single sort of, say, the life form is being singled out as a special kind with a special label. Thus, in our lexicon we find ***shajarat ad-dābb,*** not ***/shajar ad-dābb/,*** for "snakebush." In such a case, the singular and plural of the productive lexeme are again the same. This is hardly a problem in most situations, but if one wanted to make clear that one is talking about more than one individual snakebush rather than about snakebush as a kind, one can make use of one of the noncollective plurals that exist for the word *bush/tree,* such as ***ashjār*** or ***shajarāt.***

Diminutives occur at a much higher frequency in plant names than in common speech overall, except perhaps with respect to place-names and personal names. The diminutive is generally marked in Najdī Arabic by the appearance of the vowel ***-ē-*** in the second syllable of a word (or in the first syllable when a consonant cluster is word initial). In classical and modern written Arabic, the basic pattern is CuCayC (where "C" represents a consonant). In our Bedouin dialect, the short *u* of the first syllable may be absent completely, forming a word-initial, two-consonant cluster, or may be replaced by a very short ***-i-.*** In some environments, the classical *-u-* may be "preserved." The classical Arabic diphthong *-ay-* is represented by the Bedouin pure vowel, ***-ē-.***

In Arabic in general, the diminutive may also indicate, as in Spanish and other languages, something regarded with affection. It may also act counterintuitively as an "augmentative," indicating a characteristic that is particularly strongly marked or habitual. With respect to the latter, Henri Fleisch suggested that it would better be regarded as a form that indicates a departure from the mean or the usual in either direction (1961, 393). Overall, diminutive forms in the plant names for our study area appear to have the primary function not of indicating small physical size but rather of attributing the characteristics of a root noun to its referent and probably, to some extent, of marking it as a plant name. Diminutives are more frequent among the names for annual plants than for perennials. They do not occur at all among perennials that are highly salient perceptually by virtue of size or form or among those that are important grazing species.

Apart from the common diminutive, Fleisch lists several other noun forms in classical Arabic that he classes as "affectives" (1961, 390–92). One of these forms, *Ca/uCCāC,* occurs several times in the Bedouin lexicon. It has the effect of intensifying the meaning of the root and giving a superlative effect, as in the name ***ṣiffār*** for *Schimpera arabica* (the Bedouin ***-i-*** replacing the *-u-* of the pattern), based on the root *ṣ f r,* connoting "yellow" or "yellowness" and referring to the very strong yellow signature of the flowers of this cruciferous annual. A closely related form, *CuCCayC,* is so frequent among the names used in the study area that I have been tempted to dub it, in Latin fashion, a *nomen plantarum.* Examples of this form of name among our generics are ***shuwwēl, tummēr, gurrēṣ, guṭṭēnah,*** and ***ḥummēḍ.*** Enno Littman described this pattern as occurring in personal names recorded in pre-Islamic Arabic dialects such as Nabatean and Palmyrene. He described it also as a favored form for the name of plants, giving some eighty-five examples, largely from regions well outside my study area but including several of the generics used in my study area (1926, 31–41).

A fair number of generics exhibit the suffix ***-ān*** attached to root forms. In classical and general Arabic, this suffix often occurs in adjectives denoting a human condition or habitude, with semantic content indicated by the root—thus, the terms *kaslān,* "lazy" (from *kasal,* "sloth," laziness"), and *'aṭshān,* "thirsty" (from *'aṭash,* "thirst"). For some nouns in everyday speech, the suffix simply marks a plural. In Bedouin plant names, it attributes the characteristics of a root verb or noun to the referent somewhat in the manner of the English suffix *-like.* Thus, the name ***sha'rān*** (for the chenopod *Anabasis setifera*) refers to the terminal bristles on the modified leaves that resemble ***sha'r,*** or hair; and the name ***dhanabān*** (for *Reseda* spp.) refers to these plants' characteristic spiciform raceme that resembles a ***dhanab,*** or tail. I found the suffix ***-ān*** in several interesting cases of what Berlin calls *generic name extension* (1992, 31). Here, it is combined with the form of the diminutive to liken one kind of plant to another while maintaining a difference. Thus, for the composite perennial generally called ***jathjāth*** (*Pulicaria undulata,* figs. CD.269, CD.270), an Āl Murrah consultant gave the synonym ***'rēfijān,*** which is the diminutive of the name of another, quite similar (and more useful) shrublet, *Rhanterium epapposum,* figs. CD.274, CD.275): ***'arfaj*** with the suffix ***-ān*** added. Similarly, Muṭayr consultants used the name ***'wēdhirān*** for the

the weedy (and rather useless) *Artemisia scoparia,* a plant that resembles the more widespread and useful species called ***ʿādhir*** *(Artemisia monosperma).* The use of this particular "likening form" seems to convey the idea that "this plant looks very much like plant X, but it is different and should not be confused with it." I should add that I am not entirely sure that these names are not nonce forms. The format is certainly convenient for such use. The semantic interpretation would apply whether it is a "good" name or not.

Another plant name form that catches the ear and eye is the use of modified syllabic reduplication with the second syllable carrying an infixed long vowel, usually ***-ā-,*** for example, ***ramrām, basbās, ragrūg, jathjāth, gaḏgāḏ.*** These names are apparently formed by reduplication from biliteral roots (which are overall fairly rare in Arabic), although the semantic relationships with the respective roots are in many cases vague.

Nouns with quadriliteral roots (those with four root consonants) are not as rare in Arabic as biliterals. Sabatino Moscati has noted that in the Semitic languages overall, animal names figure prominently in such forms (1964, 84), and I had long wondered about the high frequency in Bedouin as well as in classical Arabic of quadriliteral animal names such as ***thaʿlab*** (fox), ***ʿagrab*** (scorpion), ***gunfudh*** (hedgehog), ***ḏrimbān*** (ratel), and ***jarbūʿ*** (jerboa). My data show that quadriliterals occur in plant names with equally uncharacteristic frequency. Just a few examples include: ***khiḏrāf*** (for *Salsola volkensii*), ***ʿujram*** (for *Anabasis lachnantha*), ***ʿandab*** (for *Cyperus conglomeratus*), ***ʿishrig*** (for *Cassia italica*), and ***bʿēthirān*** (for *Artemisia judaica*). I do not include here names quadriliteral in form but probably derived by syllabic reduplication—that is, forms such as ***ramrām*** and ***ragrūg,*** noted earlier). At least one of the names used in the study area, ***harṭallas*** (for *Bienertia cycloptera*) seems even to involve a quinqueliteral. My impression is that all of these names have a peculiarly archaic look. The origin of some four-consonant forms has been explained in terms of simple phonetic processes, such as the dissimilation of geminates, with one of the pair becoming *n,* or fluctuations of liquids, such as *sirḥān* (wolf) becoming *sirḥāl* (Fleisch 1961, 502). I saw such phonetic shifts in a few cases of intertribal variation in name forms. Āl Murrah consultants, as an example, gave the variant ***gungulān*** for a name widely accepted as ***gulgulān.*** Some quadriliterals may have an origin in early Semitic prefixes. Fleisch gives Henrik Nyberg's example of how

an old demonstrative *s* (*ša* in Akkadian) became prefixed to a triliteral with the semantic effect of Arabic *dhū* (that with, that which has) (1961, 503). Thus, the Arabic word *sa'tar* (thyme) comes from from *s* + *'itr,* "perfume," meaning "that which has perfume." The high frequency of the phoneme *'* ('ayn) in Arabic plant and animal quadriliteral names has led me to speculate about a possible relict, proto-Semitic "name of living thing" determinant. Fleisch, however, considers a shift from hamzah to 'ayn as a phonetic process, which might account for some of the 'ayns we see in plant and animal names, in particular those in word-initial positions.

Some common Arabic noun and adjective forms are conspicuously *absent* from our plant names. Forms with the prefix ***m-*** denoting participials, both active and passive, very common in everyday speech and in written Arabic, are absent in my ethnobotanical lexicon. The only possible exception is the name ***mḥarūt*** for *Ferula* species in northern Arabia, which in form is close to a standard past participle of the classical pattern *mCCūC*. I would suggest that it is more likely that the terminal ***-ūt*** is a relict of some early Semitic feminine *-t* suffix (there seems to be no recognized root *ḥ r t*). In general spoken and written Arabic, the *m-* prefix also marks two other important noun types: the "noun of instrument" and the "noun of place." An example of the first is *minshār* (an instrument for sawing, a saw) from the verb *nashar* (to saw wood); an example of the second is *majlis* (place of sitting, sitting room) from *jalas* (to sit). I think that the *absence* of the noun of instrument, which seems ready made for naming a plant by its use, is significant in two ways. First, it underscores the perceptual over the utilitarian as the primary "coining motive" for the Bedouin plant names; second (along with the lack of the other *m-* constructions), it confirms the basically substantive rather than verb-derived nature of these names, as discussed in the following section.

The Question of Semantic Transparency. One might well question, given my comments made earlier about the theoretical derivation of Arabic nouns from triliteral roots with established semantic content, why I provide English glosses for only about 120 (40 percent) of some 300 plant names, including synonyms. This gap might be accounted for in a few cases where for names of nonobvious content I failed to inquire about meaning. In the great majority of cases, however, I did ask consultants about the meanings of names. I was struck, early on and rather naively

I now think, by the frequency of cases where Bedouins did not know the "meanings" of generics. For example, when asked about the meaning of the name ***'arfaj*** (for the well-known composite shrublet), my consultants would at first not understand what I intended by my question. After I explained, usually by analogy using a well-known plant name that was obviously transparent, they gave responses such as the following: "Well, it doesn't mean *any*thing. It just means ***"arfaj,'*** you know, that bush." In other words, it had no more meaning for them than the names *oak* or *pine* have for me. If I persisted in my request, consultants would sometimes obviously start thinking hard to come up with some kind of meaning and would throw out some explanation such as "maybe it has to do with X" or "it might mean Y." Such explanations were sometimes based on semantic content of the linguistic root concerned; they could apparently see some kind of root connections. But their answers were obviously nonce responses and varied from consultant to consultant.

The relationship between Arabic plant names and linguistic roots, I now think, was admirably summed up in a statement by one of the great Semitic linguists, Gotthelf Bergsträsser. Speaking of proto-Semitic (the hypothetical ancestor of all Semitic languages), he said: "The opposition between noun and verb differs notably from that in most other languages. On one side stands a relatively small number of what are strictly substantives proper, not further analyzable, originally not obeying the rule of a consonantal root, which name things (kinship terms, animals, body parts, tools, etc.); on the other side is the large group of nominal-verbal roots, which designate attributes, states, or actions. The gulf between the two kinds of root is bridged only at a later stage through the formation of denominal verb stems on the one hand and deverbal names of things (e.g., nouns of instrument, *miptāḥ* 'key' from *ptḥ* 'open')" (1983, 10). In other words, many plant names may well have appeared first as unanalyzable substantives and were then attributed to a verbal root only at a much later stage through the manipulations of the early Arab lexicographers and grammarians. This process might lead to a situation, I have long suspected, in which dictionary-declared meanings of linguistic roots associated with plant names are derived from the attributes of the plants themselves as opposed to plant names developing in response to "basic" verbal root semantics. It is thus quite possible, to give one example, that dictionary meanings associated with the root *r m th,* associated with the

idea of being "disorderly" or "mixed," stem from the physical characteristics of the ***rimth*** bush *(Haloxylon salicornicum),* which is finely branched and tangled, rather than vice versa. An even more telling example is Edward Lane's entry for the root *sh j r* in his monumental Arabic lexicon, which begins (using my transliteration) "*shajar*^{un} is an inf. n. of *shajara,* and signifies the *being or becoming, intricate, complicated, perplexed* . . . hence the word *shajar*^{un} [trees and shrubs], because of the intermixing, or confusion, of the branches[!]" ([1863–93] 1968, 4:1506).

For all these reasons, dictionary speculations (all too easy because words are arranged in the order of their root consonants) about the "meanings" of Arabic plant names can be misleading if not entirely circular and should thus generally be avoided. In addition, for many dictionary roots, multiple meanings are offered, none of which apparently has anything to do with the plant of a name theoretically "derived" from them. Thus, in the list of generic names in chapter 6 I have resisted the temptation to supply speculative interpretations for many names that appear to be opaque semantically. In some cases, I have found dictionary roots or words that are obviously or very probably closely related to otherwise unexplained plant names in some interesting way and have noted that relationship in hedged terms. I do not mean to imply, however, that I believe that a name is derived *from* a given root or that Bedouin consultants would necessarily offer the same explanations.

Attributes in Analyzable Plant Names. I am not saying, however, that Bedouin Arabic plant names cannot carry clear meaning. Many of them, in particular the complex lexemes, obviously do, and I have not hesitated to offer glosses for them. This point leads to the question of what *kinds* of meanings are generally associated with our glossable plant labels. First, it is obvious that the overwhelming majority of the names can be classed as physical descriptives concerned with perceptual characteristics of their referents. The means of description, however, are wide ranging, from simple color or texture attributes to references to inanimate objects and animals. Only two names are patently and directly utilitarian. One is ***dabghah,*** "tanweed," for *Erodium glaucophyllum.* I have no data indicating a use of this plant for tanning at the present time, but there is evidence of earlier use of at least one species of *Erodium* for that purpose (see the entry ***kirsh*** in chapter 6). The second is ***ghaslah,*** "wash bush," applied by

a consultant of the Shammar tribe to *Anabasis lachnantha*, a bush that was sometimes used pounded up as a soap substitute. A few names, I believe, can be classed as indirectly utilitarian in that they act as what I would call "herdsman's markers," indicating dangerous or noxious species with regard to grazing livestock. In this category are two names that include the word for "earth, sand" and that apply to plants that can cause sand colic when ingested by livestock (although the "sandy" aspect of the plants might also be interpreted as being perceptual), referring to the adherent sand always seen on their viscous surfaces. Another such name is for a plant that is poisonous to livestock, ***shajarat ad-dābb,*** "snakebush." One plant is called ***marār*** (bitterbush) only because its consumption by camels causes bitterness in the camel's milk. The ***kirsh*** plant (its name meaning "paunch, rumen") has not been labeled so because it resembles that ruminant organ in any way, but because it can cause bloat in livestock. Some names involving animals or birds, such as ***shajarat an-na'ām,*** "ostrich bush," might be said to have some utilitarian value in marking promising habitats for hunters. The following descriptive categories cover virtually all my glossed names:

Shape of overall plant or main stems (sixteen generics): These names range from simple adjectives such as *thick, slender,* and *fine* through form analogies such as *netlike* (for the scrambling parasite *Cuscuta)* to the use of human anatomical terms such as *fistlike.*

Shape of inflorescence or fruits (21 generics): Shape names range from anatomical analogies such as *tail-like* (for the inflorescences of Resedaceae species) to inanimate object forms such as *little bell.*

Color (13 generics): Color names include *yellow* (3), *milky* (2, referring to plant sap); one each of *black, pearly, gray, dark green, red/blonde,* and *white;* and two with *horse-blaze,* in reference to mixed white and reddish. The color names are applied in about equal numbers to flowers and to other plant parts.

Surface texture (fourteen generics): Texture names include *cottony/feltlike* (3), *rough, scabrid* (2), *itchy/hot* (2, in reference to irritating hairs), *sandy* (2, referring to adherent sand), and one each of *mangy (bullate), woolly, furry, hard,* and *wet* (meaning "viscid").

Taste (4 generics): one each of *sour, bitter, salty,* and *hot.* The term for "bitter" was in reference to the taste of milk from a camel that grazes on the plant referent.

Odor (9 generics): *stinky* (8) and *sweet, fragrant* (1). Unpleasant odors are obviously more salient here than sweet ones, and the labels for "malodorous" are in most cases based on strong words such as *turd, offal,* and *rotten.* Only one of the numerous desert plants with sweet, fragrant flowers was labeled for odor. Names denoting unpleasant odor perhaps have some utilitarian significance in that the plants tend to be noxious with respect to livestock grazing. One of the plants with such an odor, however, ***msēkah*** *(Haplophyllum),* is said to be liked and sought by camels.

Armament (6 generics, names referring to spines or toothlike appendages): Use of the term ***ḏirs,*** "tooth," occurred several times. References to spines were through analogous nouns such as ***mishṭ,*** "comb," but the common term for spine itself ***(shōk)*** did not occur.

Extensions of other plant names (7 generics): These names are based on the generic names of other plants, usually more common or useful species, that they resemble. The extensions seem to take a limited number of forms, one of which is simply the diminutive of the model, another the diminutive and the ***-ān*** suffix combined (as described earlier).

References to animals and birds (15 generics): References to both wild and domesticated animals occur here, with one each of the following: *hare, wolf, ostrich, bifasciated lark, jerboa, scorpion, hedgehog, snake, camel, donkey, swine* (or *carnivore;* see the entry ***khiyyēs*** in the generic list), and *goat.* There were three names that included *raven.* Several of these names are complex productives, such as ***shajarat an-na'ām,*** "ostrich bush." Others refer to specific parts of animals, such as ***idhn al-ḥimār,*** "donkey's ear"; ***liḥyat at-tēs,*** "goat's beard"; and ***krā' al-ghurāb,*** "raven's shank." All of these plants have stems or leaves physically resembling the animal parts referred to.

Names with human anatomical terms (13 generics): These names likened plants or their parts to the hand/fist (3), beard (2), head (2), hair (2), penis (2), fingers (1), and eye (1).

References to specific people (two generics): The only two names in this category refer to the same plant *(Anastatica hierochuntica),* generally known as ***kaftah*** or ***kaff maryam,*** "Mary's hand," a reference to the mother of Jesus. It has the synonym ***jmē' fāṭmah,*** "Fatimah's little fist," Fatimah being the daughter of the Prophet Muḥammad by his first wife, Khadījah. This plant is associated with and used only by women, being considered a medicinal that eases childbirth.

References to motion (1 generic): The one referent is ***gulgulān,*** for the crucifer *Savignya parviflora,* which has thin, flat fruits on longish capillary pedicels. These fruits, particularly when ripe and drying, dance and shake ***(tgalgal)*** in the slightest wind (although the derivation might in fact be from plant to verb!).

5.3.7 Variation in Generic Names

As indicated by the rather large number of synonyms in my data, there is a fair amount of variation in the names given for particular plants. Single consultants in a few cases gave different responses for the same plant on different occasions, but such cases were very few and were almost always variations on what was obviously the same name, such as using the diminutive on one occasion and the standard form on another. Intertribal variations often also seemed to be of the same order of magnitude, with one group regularly preferring the diminutive, the other the standard.

Consultants of different tribes sometimes gave completely different names for the same plant, however. When I looked at this variation overall, it became apparent to me that in many cases these differences were appearing on a geographical basis rather than along tribal lines. For example, several different tribes of northern Arabia used the term ***ḥamāṭ*** for the well-known boraginaceous dwarf shrublet *Moltkiopsis ciliata,* whereas more southern groups closer to the study area center used ***ḥalam.*** Likewise, northerners labeled the important shrub *Calligonum comosum* as ***arṭā,*** whereas southerners used the name ***ʿabal.*** There seems to be some correlation here with the northern and southern subdialects of Najdī Arabic. Both northern and southern groups were aware of the other's practice, and I would sometimes get responses such as "This plant is X, but Shammarīs call it Y." One of the two groups sometimes employed *both* of the names for one plant, not in a general-purpose sense but for different growth stages or condition states of the same generic (see section 5.3.8).

Major differences between the northern and southern groups, on one hand, and the far southern groups—say, of the southern Rubʿ al-Khālī—on the other was another matter. The far southerners came up with names, even for well-known plants found also in the north, that were clearly exotic

and often not recognized at all by the more northern groups. Tribesmen of Āl Rāshid, for example, used the name ***ḥardhā*** for one of the most common *Acacia*s of the peninsula *(A. ehrenbergiana),* a tree known elsewhere by the very stable name ***salam.*** Such forms were in fact used by groups that do not speak Najdī Arabic at all, but rather one of the subdialects of southern Arabia that have as one characteristic the substitution of ***y*** for ***j*** (my Rāshidī consultant who used ***ḥardhā*** also used ***yibāl*** for ***jibāl,*** "hills, mountains"). I have included some of these names in the generic list, with the tribes of consultants indicated, although they do not strictly belong to the study area.

Of all my consultants, those from the Āl Murrah provided names closest to plant name forms recorded in classical Arabic early in the Islamic era. This was particularly true with respect to vowel sounds. With Āl Murrah speakers, syllables in plant names voweled with short *u* in early classical records appeared, at least in some contexts, as clearly that vowel rather than the ***i*** or the complete elision characteristic of other subdialects. A long terminal ***ā*** was also audible (especially when consultants repeated names carefully to correct the investigator's pronunciation) on words that were often recorded classically with the termination *alif maqṣūrah,* such as *ḥulāwá* and *khuzāmá.* Ingham also noted terminal *ā* on words spoken by Āl Murrah consultants (1997, 98); his five examples of such forms are in fact plant names. The terminal vowel on the same names spoken by my consultants in other tribes were usually not distinguishable from the common short feminine *-ah.*

Bedouin plant names, in general, appear to be very conservative, even archaic forms, and intertribal comparative studies might well provide insights into historical tribal relations and geography. For example, we might ask: Is the traditional genealogical connection between the Āl Murrah and ʻUjmān—or at least a common original homeland—reflected in common aspects of their plant nomenclature? Ingham has already found the dialects of these two tribes to be "almost identical" at the structural level (1997, 87–88). I have records of the tribal affiliations of the sources for virtually all of my recorded names, but the tribes in my study were not selected for particular hypothesis testing, and the number of consultants for some tribes was too small for statistically sound comparisons. This subject would be an interesting field for future research.

5.3.8 Growth-Stage Generics

Another feature of Bedouin plant nomenclature is the use of specialized sets of generic names that are substituted for the general-purpose names of important grazing plants when it is important to convey growth stage or condition information about them. These words are not descriptive phrases or adjectivals. They take the form of alternative generic name sets, each of which can be applied to only a single, general-purpose generic. Here are some examples, with tribal sources as indicated:

For ***'andab*** (the sedge *Cyperus conglomeratus*): when small, ***thiddā*** (Āl Murrah); when dead and dry, ***damdīm*** (Āl Murrah). ***Thiddā*** is a phonetic variant of ***thundā,*** used as a general-purpose name for this sedge in northern Arabia. Thus, general-purpose regional synonyms may sometimes contrast with one another as growth-stage names.

For ***thmām*** (the perennial grass *Panicum turgidum*): when with new leaf and stem growth, ***ḥajnā*** (Qaḥṭān).

For ***ḥalam*** (the dwarf shrublet *Moltkiopsis ciliata*): when dry, ***khashin*** (Āl Murrah); when small, ***ligaṭ*** (Banī Hājir). For a Qaḥṭānī consultant, however, ***ḥalam*** was a growth-stage name used for "small, young ***ḥamāṭ***" (***ḥamāṭ*** being a general-purpose synonym for *Moltkiopsis* used generally by some tribes). This is another example of general-purpose synonyms sometimes contrasting as growth-stage terms for the same referent.

For ***nuṣī*** (the perennial grass *Stipagrostis plumosa*): when newly sprouted from seed, ***gṣām*** or ***shatīl*** (ad-Dawāsir); when growing as depauperate plants on hard ground, ***tbēnī*** *(*diminutive *nisbah* form from ***tibn,*** "straw," Āl Murrah); when very large, ***ḏa'wīt*** (Āl Rāshid and other southern tribes speaking southern Arabic); after it has dried and gone pale in color, ***thghām*** (Banī Hājir).

For ***ẓahr*** *(Tribulus arabicus):* when small seedlings in their first year of growth, ***ẓrēgah*** (Āl Rāshid); when more than two years old but not yet fully grown, ***'ithwah*** (Āl Rāshid).

For ***ḥādh*** *(Cornulaca arabica):* when small, as seedlings, ***jarū*** (Āl Murrah, Āl Rāshid); when flowering (with yellow anthers protruding from joints), ***wāris*** (Āl Rāshid); when in seeded stage (with woolly stem joints), ***jādir*** (Āl Rāshid); after seeds have fallen, ***mrēkhī*** or ***sillī*** (Āl Rāshid). The latter name, ***sillī,*** is probably the consultant's southern

Arabic pronunciation (the ***j*** shifting to the terminal form of the semi-vowel ***y***) of ***sillaj,*** a name applied in the central study area to a different species of *Cornulaca*—yet another example of a general-purpose generic's becoming elsewhere a growth-form generic (in this case for a different but related species).

Growth-stage generics are of obvious utility in a pastoral society, providing a common code for concise description of vegetation conditions. They appear to reach their greatest development among groups frequenting the more southern and hyperarid parts of our study area, such as the Rub' al-Khālī. Here, species diversity is highly restricted, and information on the precise growth stage and condition of the available few becomes the vital intelligence of the range scout. Growth-stage names also appear to be used among Bedouins in North Africa. Gauthier-Pilters, describing grazing practices of the Reguibat Bedouins in the highly arid western Sahara, reported the use of three such names for *Stipagrostis pungens* (giving the species as the taxonomic synonym, *Aristida pungens*). The North African plant is a perennial grass similar in habit and habitat to *Stipagrostis drarii* in our study area and in fact bears the same Arabic general-purpose name, ***sabaṭ***. When in flower it is in Africa called (in Gauthier-Pilters's transliteration) ***eilag,*** the camels then cropping only the flowering parts. When the inflorescences are gone, leaving the green vegetative parts, it is called ***azaran.*** When the plant is dried and overgrazed, the camels preferring the small dry leaves near the plant base, it is called ***halfoe.*** These names are used for only this one generic (Gauthier-Pilters 1965, 1541, 1573).

5.3.9 Classification and Subsistence Mode

In the early 1970s, at the time Berlin and colleagues were describing their general principles of ethnobiological classification, the greatest part of the folk classification work done on a modern theoretical basis had dealt with societies based on small-scale agriculture. Later in that decade, however, and particularly in the following one, a number of workers had extended such studies to another subsistence type, that of hunter-gatherers or foragers. These investigators (e.g., Hunn and French 1984) were discovering that their data differed in several respects from that obtained from small-scale farmers. Two of the most significant differences concerned

the breadth of the classifications, expressed as the number of labeled taxa, and their depth at the subgeneric level. Hunter-gatherers appeared to label significantly fewer taxa overall and to have fewer (in some cases zero) examples of subgeneric categories.

Brown's 1985 study was the first broad-scale comparative research dealing with both numbers of generics and the presence of binomial labeling, which is closely correlated with subgeneric categorization. He showed that of the classifications studied, cultivators had, on average, more than four times the number of labeled plant categories than did hunter-gatherers. With respect to classifications of animals, they had nearly twice as many. Among the farmers, binomial names comprised on average some 36 percent of their plant labels, whereas among the foragers the proportion of that category ranged from zero to about 7 percent. Figures for animal names were similar. Brown's analysis was the subject of some criticism, largely concerning the comparability of the data he amassed. There is general recognition now, however, that his qualitative conclusions were correct. Berlin, counting only from ethnobotanical descriptions that were relatively complete, found an average of 520 labeled generic taxa for 17 traditional cultivator groups and 197 taxa for 7 societies of noncultivators, virtually all of the latter being hunter-gatherers (1992, 98). He qualifies this finding, however, by pointing out that the foragers studied generally occupied habitats of less biological diversity than did the cultivators and that a properly controlled comparison would have to involve studies of the two subsistence types living in the same environment (99). Thus, the hunter-gatherers' smaller and shallower inventories might be the result of a more restricted expression of nature.

Assuming, however, that a significant difference between the two subsistence modes according to either Brown or Berlin actually existed, an explanation was called for. Hunn and French (1984) and Brown (1985) independently suggested virtually the same explanation, based on observations by Richard Lee (1979). In brief, small-scale cultivators are subject to crop failure and have to maintain a broad and deep knowledge of wild plants as famine foods. Their higher population densities call for the broadest possible famine use of wild plants. Foragers, in contrast, deal continually with wild species that by virtue of long natural selection are already drought resistant. Expanded and binomial labeling follows from the agriculturists' need to classify this wider inventory, according to

Brown, who also points out the greater need of cultivators for medicinal plants (1985, 49–50).

I have always felt that this explanation is a bit strained. For one thing, the subsistence agriculture widely practiced in tropical climates would seemingly seldom suffer from drought (although crop disease or pests can be a factor in such horticulture). Berlin objected to the Hunn–French and Brown argument by pointing out that a real difference in inventories of generics between cultivators and foragers *"in the same habitats"* had not yet been proved and that there was evidence that uncultivated plants recognized by two New World horticultural groups did not correlate with edibility, as would be expected by the famine-avoidance explanation. He thought, rather, that the development of subgeneric labels among cultivators would come "as part of the process of human beings' conscious construction and manipulation of new and perceptually different forms of life" (1992, 283–85, 286, emphasis in original).

I think Berlin's explanation is highly plausible, and I would give it a bit of utilitarian spin, speculating as follows: Horticulture always involves some degree of artificial selection, as particular cultivars are found to vary and to be preserved for some valuable feature, such as increased size or edibility, whereas less useful ones are dropped. These new cultivars, for obvious practical reasons, require labels, and the most natural process for marking them is simply the throwing on of some adjective to the original generic (they are already and obviously a form of *that kind*). These secondary lexemes develop not through any christening process but simply through repetitions of handy binomials that "catch on." Once a few such names enter the lexicon, a speech pattern is established and leads to imitations of a handy model. Small-scale cultivators are generally well in touch with the wild flora as a source of medicinals, specialty foods, and construction materials. Plausibly here also, this "more detailed way" of looking at plants will be extended, and more taxa will become labeled (and more of them binomially) in that domain.

Whatever the real situation, a natural question arises as to how a famine scenario would affect pastoral nomads such as the Bedouins. It is well known that pastoralists, like horticulturists and particularly in arid environments, can suffer from devastating production losses, mainly from droughts. Might our Bedouins, having lost their camels, resort to wild famine foods to save their own hides? The answer is no. The cultivators

have the choice of moving from the fragile, man-made environment of the fields to the more robust and naturally selected world of drought-resistant wild plants. The Bedouins have no such option. The wild plants that they might eat are even more dependent on rainfall than the vegetation serving as input for their herds. As I have seen on many occasions, the edible plants ***rubaḥlah*** and ***ṣiffār*** as well as the ***fagʻ*** (and all the rest) simply don't appear at all when the rains fail. This is the main reason why I believe (as suggested in section 4.3 and with two exceptions) that Bedouins have collected edible wild plants primarily as dietary supplements rather than for famine relief. Bedouins' response to drought is rather in the direction of relieving their livestock, by whatever means possible. They will cut by hand the normally unpalatable perennial ***kidād*** *(Astragalus spinosus),* burn off the spines, and make the now-disarmed leaves and branches accessible as fodder. They will take their herds to phreatophytes such as *Acacia* species, if available, or to other perennials. They may resort to succulent halophytes that are normally shunned. In recent times, sacked barley or other fodder purchased with government support will do the trick. And white plastic bags will litter the desert.

The Bedouins are neither cultivators nor hunter-gatherers (although both aspects of the latter have traditionally supplemented their herding to some extent), so how do they stand with respect to the number of labeled taxa and the proportion of polytypic genera? As seen from the account of generics and subgenerics here, they clearly appear to lie nearer the camp of the foragers, at least as the latter have been described so far. My total of 231 generics is not far from Berlin's average of 197 plant names for well-studied hunter-gatherers, compared to 520 for horticulturalists. With respect to the proportion of polytypic generics, the figure here is exceedingly low, hardly more than 1 percent, compared to Berlin's (1992) mean of about 20 percent for cultivators and close to the low figures he quotes for hunter-gatherer cases (1992, 275–80).

Any absolute number for labeled taxa is of course a function not only of culture but of habitat ecology. The eastern Arabian environment is an arid to hyperarid desert, and the maximum number of plant folk labels (particularly in view of the very low number of specific names) can hardly exceed 400, the approximate number of scientific plant species in the Bedouin desert universe. At the other extreme, in tropical environments with thousands of plant species, limitations of human memory become operative.

Thus, even there (according to Berlin [1992, 98]), the maximum number of labeled taxa generally lies in the order of some 500. Even relative figures for labeled taxa can be skewed by environmental considerations. Surely it is easier for the Bedouins to name and remember their 73 percent of 400 scientific species than it is for a group of tropical cultivators to keep track of half of 2,000.

Despite these limitations (and entering again the realm of speculation), I would venture some ideas on the relationship of plant classification to the pastoral nomadic subsistence mode. First, if small-scale cultivators are *highly* manipulative of their plant environment, their crops requiring not only planting but constant care, observation, protection, and the labeling of cultivars, then hunter-gatherers are *less* manipulative, having (mainly, although habitat modifications such as by fire may exist in some groups) only to lift their naturally nurtured produce at the right time and in the right place. Nomadic pastoralists, such as Bedouins, are *least of all* manipulative of plants because they have only to lead their herds to the right place then retire to an overlooking knoll and (these days) to open a Chinese-manufactured thermos for a cup of coffee. This description is, of course, an oversimplified picture of pastoralism, but the point is that the relationship with plants here is generally very much at arm's length, buffered by domestic animals. It is the herded ruminants, not the herder, that perform the final selection, harvesting, and processing. Given this degree of insulation, I would expect Bedouins to have less concern for the fine points of plant differences and therefore a low proportion of specific-level taxa, and I find this to be the case. The low number of labeled generics might also be smaller than among cultivators. The latter supposition also fits my data, but the limited diversity of the desert flora studied may very well also play a role there.

A larger question is whether any such generalizations might be made about the pastoral subsistence mode, anywhere. Comparative data are sparse, but I found useful four ethnobotanical surveys carried out in East Africa by Bernd Heine and colleagues between 1985 and 1988, having as subjects the pastoral groups in the northern part of Kenya. They deal with areas ranging from arid to dry subhumid on the UNEP aridity scale (UNEP 1997) and thus provide some spread of plant environments. Much effort was put into describing plant uses in these studies, but they also carried out a survey of overall plant classification for each group following

the framework of Berlin, Breedlove, and Raven 1973 and 1974. A comparative plus is that the languages are non-Semitic and thus not related to Arabic.

Some differences between Heine and colleagues' study areas/subjects and mine are noteworthy. The climate regime is different, with the African area having rains that are more evenly distributed throughout the year and lacking the single long rainless period found in the less tropical and more arid parts of Arabia. One group, the Samburu, exploits an area that is decidedly more mesic—a plateau of about 2,000 m elevation with scattered trees on grassland and annual rainfall of some 500 mm, falling mainly in spring and summer (Spencer 1973, 5–7). The Samburu do not, however, engage in cultivation. The climate is of course reflected in the flora, in which there are more tree forms, with the annuals being less prominent. Grasses constitute a much more important part of the vegetation, and the extensive subshrub communities are absent or attenuated. The saltbush group found in my study area, important both ecologically and in my Bedouin classification, is for the large part absent in the African area. East African livestock practices are conditioned by the need for salt by ruminants, but the mineral sources of salt are natural salt licks, often associated with watering points (Spencer 1973, 8). One group, the Rendille, have camels as their large livestock type; the other groups are raisers of cattle and smaller stock. Some of these African groups are described as "pastoral nomads," but their degree of nomadism appears to be significantly lower than the Bedouins'. The Samburu and the Chamus, in a region favored with higher rainfall, would appear to be the least so, although they do move around seasonally (see Spencer 1973, 20–24, for the Samburu).

Except in the case of the Chamus, Heine and colleagues do not offer an estimate of the completeness (in terms of recording all labeled folk taxa) of their studies, but they appear to be reasonably exhaustive. The interpretation of someone else's data has pitfalls, particularly in the case of these studies, where the authors do not provide counting data, do not link some generics and subgenerics to scientific taxa, and do not always clearly indicate rank. I would guess that my generic counts may overall be on the high side and that the proportion of polytypy may also be too high because of the misinterpretation of some binomials that might be only generic extensions or synonyms. In the rest of this section, I summarize

the plant classifications of each of the four African groups, then compare their characteristics with the characteristics of the eastern Arabian Bedouins' classification and suggest what extrapolations might be viewed as possible traits of the pastoral subsistence type in general. I begin with the Rendille, who as arid land camel herders, seem closest to the Bedouins in way of life.

All of the Rendille information and basic data leading to my own conclusions are from Heine and Heine 1988b unless otherwise noted. The Rendille language belongs to the Sam group of Lowland East Cushitic and is therefore related to Somali. The Rendille (like the other three groups) do not label plants as a kingdom, and they divide all plants exhaustively into two life forms: (1) "tree," which also includes all other nongrasses although exemplary forms are large and woody, and (2) "grass," which refers only to true grasses defined as having long narrow leaves and jointed stems. There are "a number of intermediate categories" (I did not attempt a count), which may be labeled or unlabeled. None of those described appears to have their salience related to grazing utility. Generics total approximately 240, of which 12 (or 5 percent) are polytypic. Generics include a rather high number (36) of productive complex lexemes including the life form "tree." Many of the specific contrasts consist of only two members, of which one is a monomial polysemous with the including generic. The total number of secondary specifics is 18.

The Borana (as described in Heine and Brenzinger 1988) are one group of the Oromo, an Eastern Cushitic–speaking people inhabiting large parts of Ethiopia, northern Kenya, and western Somalia. The data here pertain only to the pastoral Borana of northern Kenya. C. P. Kirby describes them as cattle raisers (1968, 88). Bernd Heine and Matthias Brenzinger (1988) make grazing-use references to cattle, goats, sheep, and camels. The generic list for the Borana is complicated by a strong admixture of names quoted from other literature. Inasmuch as these names are said to come from Oromo-speaking sources outside the authors' study area, I thought it best to disregard them. Three different versions of life form classes were recorded from Borana consultants. The one I give here was claimed to be the "correct" one by the majority and includes the following classes: (1) "tree," comprising plants with woody stems and branches, typically of "tree" size (presumably by European concept); (2) "grerb," including grasses and other small herbaceous plants eaten in toto by livestock. Heine

and Brenzinger also present a third category intermediate between the first two and glossed approximately as "small trees" or "extremely large herbs," but with doubts about its validity as a life form. True grass is recognized as a life form category in one of the other two, alternative classifications, and the name for that class appears some sixteen times in productive complex generics referring to grasses. There are a number of unaffiliated generics, although consultants differed on their identity. Several both labeled and unlabeled intermediate categories are recognized, some of which are described as "sub–life forms" (examples being trees grouped by shape of thorns) and others as "supergenerics" (generics grouped by common characters such as presence of latex). My count of generics totaled about 446, of which some 23, or 5 percent, are polytypic. The count for binomial specifics was about 93. Contrast sets of folk specific rank tended to be larger than in the other three groups studied.

The Chamus (Heine and Heine 1988a) have an economy more "mixed" than that of the other three described, engaging in animal husbandry (cattle, goats, and sheep) but also farming and fishing. They are also the one group of the four about which the authors express any reservations regarding inventory completeness. The authors say that the data presented are far from exhaustive but are likely to include the majority of Chamus-known plants and to be "representative of the plant knowledge an average adult Chamus has" (Heine and Heine 1988a, 41). The Chamus language, along with that of their neighbors the Samburu, forms the northern branch of the Maa group of Eastern Nilotic. The Chamus "tend to classify their plants into two mutually exclusive groups" (12): (1) "trees," which includes not only trees but vines and bushes down to dwarf shrub size, with the most exemplary examples being trees several meters high, and (2) "grass," which includes not only true grasses but any small plant useful for grazing livestock. Another taxon, glossed "weed," is used "occasionally" in reference to "grass"-size plants that are considered useless. The taxon's name is taken from that of a labeled plant but is said by some consultants to be only a term for "rubbish" or "waste material." Intermediates are represented by several labeled groups, including "trees with straight thorns" and "trees of milk" (latex), as well as some unlabeled groupings of generics. There are a few unaffiliated generics, the basis of which appears to be anomalous life form, not high cultural salience. Generics total 225, of which 5, or 2 percent, are polytypic. The number of binomial specifics

is 12. Many of the specifics are in contrast sets of two, with one member being monomial and polysemous with the generic.

The Samburu (Heine, Heine, and König 1988) are Maa speakers like their related neighbors the Chamus. They are above all cattle herders but also keep some goats and sheep. They recently also acquired some camels. The Samburu group their plants into three life forms: (1) "tree," referring to true trees but also to shrubs, vines, and even some epiphytes—in general to all plants "taller than one foot," (2) "grass," referring to plants "typically less than one foot tall" and "considered to be indispensable as livestock fodder" (Heine, Heine, and König 1988, 14), and (3) "weed," described as generally herbaceous plants of "grass" size but useless as livestock fodder. The authors say that the category "weed" is the most difficult to define and is surrounded by controversy as to its membership. Intermediate classes can be what the authors call "sub–life forms," such as trees grouped by thorn type or by presence of latex (which are labeled with descriptive phrases), or unlabeled small clusters of generics. An important labeled intermediate class maps closely on the scientific genus *Commiphora.* The generic list includes a large proportion of names taken from other literature, and I have generally not counted those names. Even so, the Samburu generic inventory appears to be very large, totaling approximately 650. Of these generics, about 27, or 4 percent, are polytypic (but I may have overcounted them). The number of secondary specific names is about 42 (perhaps also overcounted).

The first striking characteristic of all four African pastoral systems is the strong binary break at the life form level between "tree" and "grass" or between "tree" and "grerb." Such binary opposition is analyzed by Brown (1984a) and is closely analogous to the Bedouin "perennial/annual" set, although the main criteria appear to deal with the more usual qualities of stem texture and size rather than with perennation. The Borana's third category, intermediate between these two, is decidedly more vague and less salient, and the other groups' "weed" category is really a residue class based on utility. With respect to life forms, they all thus resemble my Bedouin classification. Two of them give greater prominence to true grasses than does the Arabian case, but true grasses are not so important for the Bedouins as a grazing resource, and the majority of grasses in our study area are of somewhat anomalous, shrublike form. The general absence of a specifically African "bush" category probably reflects the lesser salience

of that life form in that environment. The savanna vegetation there is characterized by strong tree-level and grass-level plant communities. This bipolar life form tendency thus appears to be ecologically based and may not necessarily be characteristic of pastoral societies in general.

The presence in the Samburu and Chamus classifications of intermediate-level groupings of trees by thorn type is an interesting parallel to the Bedouin Arabic class ***'iḍāh*** (trees or large shrubs with thorns). It is clear in both cases that the primary focus is on the genus *Acacia.* I have already noted how several of my major Bedouin consultant tribes have migrated from southwestern Arabia, which has a distinctive *Acacia* vegetation, and the presence of these "thorn" groupings can be attributed to the obvious practical salience of these heavily armed trees.

There is a wide spread in the generic inventory sizes of the African groups, ranging from the 240 for the Rendille, similar to the Bedouin case, to more than 600 for the Samburu, putting the latter well into the inventory size of horticultural societies. The range appears to form a cline correlated to some extent with environment, the Samburu on the least arid lands having the largest number. The Chamus data are not complete enough to consider here. The Borana, out on the more arid lowlands, also have a rather large inventory, but this greater number might be an effect of the huge territorial range of the Oromo-speaking peoples, who go from southern Kenya northward deep into central Ethiopia and over varied plant communities. Whatever the forces at work here, it would appear from these data that the pastoral subsistence mode per se may not necessarily be characterized by small generic inventory size, as appears so far to be the case with hunter-gatherers. The relatively small number of generics among the Bedouins in this study (231) may thus well be an effect of the low species diversity of their highly arid environment. Readily available data unfortunately do not allow estimates to be made of the proportion of total scientific species that are labeled by the African groups.

Focusing on an environment quite different from Africa and eastern Arabia, the Norwegian Arctic, Myrdene Anderson's (1978) data for Saami reindeer herders show some similarities to and some major differences from our Bedouin Arabic situation. It should be noted here first that Anderson was obviously quite familiar with Berlin, Breedlove, and Raven's 1973 and 1974 works but chose not to place her data in that framework, pointing out that "the Saami data did not lend itself to the assignment of

categories to ranks based on lexical characteristics; instead, it was convenient to work simultaneously over more restricted parts of the taxonomic landscape" (1978, 563). She notes three major life forms for the Saami: "tree," "fungus," and "small wild plant." "Tree" is subdivided into deciduous trees and conifers, and "small wild plant" includes labeled classes for "foliage plant," "bladed plant" (including true grasses and sedges), "lichen," and "moss" (421). According to Anderson's own accounting, the Saami have 94 labeled folk taxa for plants (564). She also equates this figure with "terminal taxa" of plants (565). There is, throughout the classification, an unusually high number of productive complex lexemes. Conclusions as to degree of polytypy among generics are difficult to reach, given the presentation format, but my inspection suggests that there might be five or six such cases. The low number of terminal taxa as well as the presence of the life form classes "lichens," "fungus," and "moss" obviously reflect ecological aspects of the Arctic environment.

The proportion of polytypic generics in all of the five pastoral groups discussed here exceeds the Bedouin proportion of 1.3 percent but extends only up to 5 or 6 percent (and this estimate may be high). This percentage is well below the roughly 20 percent that, according to Berlin (1992, 33), is typical of folk classification systems overall and falls into the range associated with hunter-gatherers (at least those studied so far) rather than into the range for small-scale agriculturists. This result supports my suggestion that pastoralists have less concern for finer distinctions in plant classification because of their "least manipulative" relationship with vegetation. It will be of interest to see, as additional pastoral plant classifications are described in future, whether this tendency is more widespread among herding groups.

5.3.10 Summary and Statistics: Folk Classification and Nomenclature

The Bedouins, like many prescientific societies, do not have a label for plants at the kingdom level. The term *nabāt,* used for the plant kingdom in written Arabic including modern scientific descriptions, is a verbal noun basically denoting "sprouting, growing out," and its early use appears to have referred primarily to annual herbaceous species. Its use was extended later in written Arabic to include the plant kingdom.

Classification at the life form level is marked by a strong binary contrast between ***shajar*** (perennial plants) and ***'ishb*** (annuals). This distinction mirrors the clear contrast in desert plant ecology between the "dry season–withstanding" perennials and the "dry season–evading" annuals, the latter emerging only in years of good rains and having an ephemeral existence of generally less than twelve weeks. Among ***shajar*** (perennials) are true trees, shrubs, nonwoody perennials, and perennial grasses. An unusual feature is the existence of a second life form level, in the category ***shima',*** denoting shrublets smaller than man height (and usually much smaller). Its members are considered to be "kinds of ***shajar***$_1$ (perennials)" and contrast with a group, ***shajar***$_2$, that is polysemous with ***shajar***$_1$ in its sense of "all perennials" and, probably prototypical for it, that consists of true tree forms and shrubs larger than man height. ***Shajar***$_2$ members contrast also with those perennials (unmarked linguistically) that are grasses or otherwise nonwoody plants. Some data supplied by consultants of tribes in northwestern Arabia hinted at the existence of an alternative Bedouin life form classification. This classification recognizes a third labeled category, ***aṭ-ṭawālī',*** denoting perennial but nonwoody plants. Insufficient data are available, however, to substantiate the use of this category without further study, and the same consultants did not deny the validity of the basic scheme presented here. The Bedouins have no labeled life form corresponding to true grasses. The term ***ḥashīsh,*** glossed as "grass" in written Arabic or in town dialects, means for the Bedouins simply "plants cut for fodder" or "hay." These plants are primarily grasses but may consist of broad-leaved species as well. Nor does Bedouin Arabic have a life form corresponding to vines, which hardly exist in the natural desert vegetation.

Several labeled Bedouin plant classes occur at the intermediate level (between life form and generics). The most important of them is the category ***ḥamḍ,*** which maps almost perfectly on the scientific family Chenopodiaceae. Its significance is essentially utilitarian, encompassing shrublets of vital importance for providing salt and other mineral nutrients for grazing camels. There is evidence that ***ḥamḍ*** is a term classifying plants and is not just a "pasture type." It contrasts directly with the category ***khillah,*** denoting grazed perennial plants that are not chenopodiaceous. A third intermediate category is ***'iḍāh,*** which includes those trees and large shrubs that are markedly spiny and which appears to focus primarily on

the genus *Acacia*. It is possibly a vestige of plant classification in western Arabia, to which region several important eastern tribes trace their origins. One unaffiliated cluster—probably best treated as covert although one consultant used a name for it—had some characteristics of an incipient life form. It includes conspicuous but anomalous plants without green stems or leaves and fungi—such as truffles, mushrooms, and flowering root parasites.

Generic-level Bedouin plant names referring to ***shajar*** (perennial plants) are highly salient, and 157, or 84 percent, of 188 scientific species of this life form in the study area's desert flora are labeled. Annual plants, as generics, are less salient, and there is a clear Bedouin tendency to think of annuals en masse rather than as individual kinds. This tendency reflects the mode of use of annuals for grazing livestock as well as their closely grouped and ephemeral nature. This lesser salience is indicated by the fact that the life form name, ***'ishb,*** is much more common in everyday speech than are the names of the generics in that category. Of the 205 scientific species of annual life form in the study area, 127, or 62 percent, are labeled with folk generic names. The total proportion of scientific species in the desert flora labeled as folk generics is 73 percent.

Only three generics are clearly polytypic, all of them plants of high cultural salience: ***nakhl*** (the date palm, *Phoenix dactylifera,* with at least five folk specifics), ***fag'*** (edible desert truffles, with four to five specifics), and ***samḥ*** (including two aizoaceous genera that provide edible seeds, with three specifics). Of these generics, ***nakhl*** and ***fag'*** are also unaffiliated with respect to life form. One other generic or quasi-generic, ***ḥurbuth*** (referring to several genera of annual legumes with a focus on *Astragalus*), includes one (questionable) folk specific and several individually unlabeled scientific species.

With respect to nomenclature, the names of both generics and more inclusive categories generally take the Arabic grammatical collective form used for the names of plants, animals usually found in groups, and a few other natural objects such as stones and minerals. These names are predominantly simple primary lexemes although complex forms also occur. Many of the simple lexemes are essentially opaque semantically. Those transparent in meaning tend to refer to physical attributes of the plants concerned, such as shape, color, and texture, although associations with animals and other attributes are also found. Virtually all of the

generic names are perceptual rather than utilitarian in nature. None of the names of the few folk specifics is a secondary lexeme in a formal sense. Their unique form, however, suggests that they are abbreviated conceptual secondaries.

Bedouins use, in addition to general-purpose plant names, a number of "growth-stage generics" for some plants of particular grazing importance. These terms are valid names applying only to individual generics and are not just adjectivals; they denote particular stages of plant development, such as seedling forms or flowering or seed production, or stages of general condition. They are of obvious utility in the reporting of general plant and grazing conditions and are used most frequently in areas that have a limited diversity of grazing plants, such as the Rubʿ al-Khālī sand desert.

In general, many features of Bedouin Arabic plant classification can be accounted for by Berlin's (1992) generalized model. There are, however, some conspicuous anomalies:

1. The use of "perennial" versus "annual" as an all-encompassing life form criterion. This perceptually based opposition reflects plant ecological facts in a hyperarid habitat with rainfall strongly restricted seasonally.
2. The presence (resulting from number 1) of a two-tiered life form structure in which "true trees," "bushes," and an unlabeled residuum of nonwoody perennials are included in the broader life form category "perennials."
3. Intermediate taxa are labeled rather than covert, as is generally (but not universally) the case (Berlin 1992, 27).

Comparative ethnobotanical data for other pastoral societies are scanty, but plant classification descriptions for some herding groups in East Africa show some points in common with the Bedouin Arabic system under study here. One such feature is a tendency to a bipolar break at the life form level between tree/shrub (or perennial) forms and herbaceous plants. This break, however, appears to be simply a reflection of the physical life forms of plants in the two regions, both of which exhibit such a perceptual dichotomy. Two of the African systems have large numbers of generics—in one case apparently exceeding five hundred—suggesting that pastoral societies' classifications in general may not necessarily be characterized, as is the Bedouins' classification, by a low number of generic names as

TABLE 5.3. Statistical summary of scientific and folk taxa

Number of Scientific Species in Core Study Area		
Vascular Perennials	188[1]	157 (84%) are labeled
Vascular Annuals	205	127 (62%) are labeled
Fungi	7[2]	7 (100%) are labeled
Total Species	400	291 (73%) are labeled
Folk Taxa		
Life Forms	4	1 includes 2 of the others
Intermediates	3	
Generics	231	3 (1.3%) are polytypic 7[3] (3%) are unaffiliated
Generic Synonyms	88 (approximately)	
Specifics	13	
Varietals	0	

[1]Includes one species of important use in the far north but not found in the core study area. Note also that generic names sometimes label more than one scientific species.
[2]Macrofungi, in particular mushrooms, are poorly studied in the study area; the ultimate total will certainly exceed this number.
[3]Does not include one generic of as yet undetermined life form.

compared to cultivator groups. However, one point in common, the low degree of polytypy among generics, may in fact prove upon further study to be a general characteristic of the pastoral subsistence mode. The reasons for such a situation may lie in the very limited degree of plant manipulation exercised by pastoralists—even less than by hunter-gatherers—as compared to small-scale agriculturists.

Table 5.3 provides a numerical summary of scientific and folk taxa.

5.4 Plants as Vegetation and Place

5.4.1 General Terminology Related to Plants

Apart from those lexemes involved in folk classification, Bedouins have a well-developed common set of terms referring to plants or vegetation in general. This terminology displays some regional variation, but for the most part it cuts across tribal lines. The following list, although incomplete, provides some feel for this specialized language.

Pertaining to all life forms:

waragah: This basic anatomical term means “leaf.” It is also used somewhat metaphorically in reference to new growth of plants and is frequently used in passing news of new spring growth from recent rains. The word ***nuwwār*** (literally “flower[s]”) is used the same way, often in reference to annuals. One herdsman may thus ask another, ***“Fīh waragah ‘indakum? Fīh nuwwār?”*** (Any new growth where you are? Any annuals up?).

ḥayāh: This metaphorical term literally means “life,” but it is also used in the sense of new growth, primarily annuals, and in the same way as ***waragah.*** The question ***“‘Indakum ḥayāh?”*** (literally “Do you have life?” but in intent “Are things growing over where you are”) is common.

Pertaining to the category ***‘ishb,*** “annuals”:

saḥḥ: This term is used among Āl Murrah (and perhaps other groups) for new plants just emerging from the ground after germination following rain. Tribesmen from northern Arabia, however, said that for them this word meant “dry, tough dates.”

dafīn: This term refers to annuals that have germinated from ***wasm*** (autumn) rains but are as yet undeveloped in winter. It is from the root *d f n,* with the basic meaning of “to bury” or “to be buried,” and it refers to growth from early-germinating seeds that is held back in development by the cold weather of winter, remaining nearly buried until the warmth of spring allows further development.

dawāwīr: Literally meaning “those that go in or make circles,” this term refers to the denser and better-developed circular patches of annual plants growing in the shelter of shrublets as compared to annuals out in the open, which are smaller and less dense. Being sheltered or being out in the open is a very perceptible characteristic of desert vegetation, and my consultants presented a plausible explanation for the denser growth of covered plants: “The bush catches more rain and protects the annuals, so they grow bigger.”

rmām (cf. classical *ramma,* “to be decayed, worn out”): This term refers to annuals that have died and dried out from the seasonal drought of early summer or from lack of rain earlier in the season. There are several widely known synonyms for ***rmām: ḥamīs*** (something “fried”), ***ḥamrī*** (referring to the color red or red-brown), ***jamīd*** (something that has become “hard, solid”), and ***sā‘irah*** (something “burning up”).

ghamīr: This term refers to patches of annuals that have died back once from lack of rain but then have sprung up again green after new, delayed rainfall.

Pertaining to the category ***shajar*** (all perennials), but mainly to the subcategory ***shima'*** (bushes):

mnammalah: An adjective with the literal meaning "anted" or "covered with ants," referring to bushes that have the first rudiments of leaves appearing early in the rainy season. The visual likeness to ants is particularly apt, I found, with respect to ***'arfaj,*** the composite shrublet *Rhanterium epapposum.*

khuḏḏār: Literally meaning "those becoming green," this term refers to bushes that are in green leaf and good new growth.

najīl: This term refers to bushes in green leaf and thus appearing dark when viewed from a distance.

jalāyil (a plural with singulars ***jalīlah*** or ***jalūlah,*** the latter used more often among northern tribes): From the root *j l l,* connoting the idea of being "high, great" (as in social status), this term is somewhat problematic. I at first took it almost as a specialized life form category specifying some kind of ***shima',*** or bush. Further discussions with my consultants proved that the term has the following characteristics: it is applied only to generics of the ***shima'*** (bush) life form that are important for grazing, and its use seems to imply good condition (green and leafy). It cuts across the ***ḥamḏ/khillah*** (saltbush/nonsaltbush) boundary and can be used for either. The following generics were offered as possible examples for use of this descriptive term, particularly when they are in very good condition: ***'arfaj, sabaṭ, rimth, thmām,*** and ***'andab.*** All these plants are important grazing plants. I can gloss the term ***jalāyil*** only as something like "good grazing plants in good condition." It would obviously be useful to a herdsman returning from a vegetation-scouting expedition.

rīf: The linguistic root *r y f* is associated with ideas of "fertility, fruitfulness." Explanations for this term were rather variable, but it appeared to be a collective for perennial plants, in particular grasses, that provide grazing into the rainless period of early summer. Some consultants said the term ***rīf*** refers to dry plants, in particular dry grasses; others allowed that the plants can be green still. Generics particularly associated with the term are the grasses ***nuṣī*** *(Stipagrostis plumosa)* and ***sabaṭ*** *(Stipagrostis drarii).* Both are important early summer grazing species.

5.4.2 Plants and Topography

The Bedouin describes his desert lands with a rich repertoire of topographic terms, and vegetation often plays an important role in defining or characterizing those lands. The two factors are sometimes so closely related that it is difficult to decide whether words are basically topographic terms characterized by certain plants or plant community names associated with particular land forms.

The name ***gōz*** (pl. ***gīzān***), for example, is defined as an area of sand terrain having ***ghaḍā*** shrubs *(Haloxylon persicum)* as the dominant perennial. Tribes in northern Arabia use the term ***gaṣīmah*** (pl. ***gṣāyim***) for the same feature. ***Ghaḍā*** is one of the largest shrubs found in the deep sands, and stands of it are always characterized by unusually large, wind-blown sand hummocks that accumulate around the shrub bases. The shrubs are also fairly wide spaced compared to the situation in areas carrying other perennials. The term ***gōz*** thus immediately conjures up a specific terrain type known by all Bedouins. A stand of ***ghaḍā*** is distinguished by a special term presumably not only because the terrain is distinctive but because of the importance of the shrub for both saltbush grazing and for firewood supply. For reference to a place characterized by one dominant shrub, I also once heard the plant name put into the special Arabic grammatical form called the "noun of place or abundance." Thus, the term ***mirmāth*** was applied to a "place abounding in ***rimth*** shrubs" *(Haloxylon salicornicum).*

Other terms may be less specific but nevertheless associated with individual classes of plants. They usually can also be considered names for grazing or range types. Banī Hājir apply the term ***'afjah*** (pl. ***'ifāj***) to an area with mixed ***ḥamḍ*** (saltbush) vegetation. For a ***ḥamḍ*** area particularly good for camels, with such species as ***rimth*** *(Haloxylon salicornicum)* and ***ḍumrān*** *(Traganum nudatum),* southern tribes including Āl Murrah and Qaḥṭān use the term ***msās.*** A synonym used in the north among the Ruwalah is ***marī*** or ***mara'.*** The opposite of a ***msās*** is a ***wakhmah*** (pl. ***wkhūm***), an area without ***ḥamḍ*** and usually with poor grazing of other sorts.

Banī Hājir and Āl Murrah use the term ***ḥamrūr*** (pl. ***ḥmārīr***) for areas of sand terrain that carry perennials said to be ***khafīfah*** (light, thin), such as grasses or the sedge ***'andab*** *(Cyperus conglomeratus).* A more general term is ***marbakh*** (pl. ***mrābikh***), applied to an area dotted (and usually

hummocked) with bushes, sometimes of any type but often of the class ***khillah,*** nonsaltbushes. A consultant of Banī Hājir used the term ***ʿafsh*** in much the same sense: "ground with many bushes."

An area virtually without any perennial vegetation at all, particularly in the northern plains where shrubs are overall fairly plentiful, is called a ***graʿah*** (baldland). The same word, with definite article, is also the name of a specific shrubless area in the northern plains of Saudi Arabia's Eastern Province.

As an aside, I mention here the topographic term *dikākah,* which appears in the glossaries of some maps of eastern Saudi Arabia prepared by the Arabian American Oil Company (now the Saudi Arabian Oil Company). The meaning given for this term on map legends is always something such as "ground with dense sand hummocks around shrubs, difficult to traverse by motor vehicles." Early American geologists picked up this term in the 1930s from some unknown source, and because it has obvious utility, it has been passed on through several generations of American field personnel to the present day. To be an "experienced desert hand," one had to know and use the term *dikākah.* I questioned numerous Bedouins of different tribes about this term, but none of them knew it as a terrain type (although some Bedouin guides learned to use it once it had become part of oil company lore, probably because that's what their bosses called it). Among themselves, Bedouins usually simply use the word ***waʿr*** (meaning "rough place") for such terrain. "Ad-Dikākah" does occur as the proper name of a specific area in the southern Rubʿ al-Khālī, but the explorer Bertram Thomas's description of this region, both in words and photographs (1932, 188–203), indicates nothing of close-spaced bushes and much of rolling sand terrain only dotted here and there as usual with occasional shrubs. Wilfred Thesiger went as far as putting this word into a list of topographical terms, spelling it *dakaka* and defining it as "undulating ground consisting largely of hard packed sand," but he apparently used it in his writings only as the proper name of the region Thomas traversed (1949, 44). In any case, the geologists' term *dikākah* was in use before Thesiger's travels and before they themselves had penetrated that deeply into the southern sands. Its origin is still a mystery.

Bedouins often give directions to travelers in terms of the boundaries of plant communities—for example, "Go north until you come to the end of the ***rimth*** [*Haloxylon salicornicum,* the dominant bush in a well-known

community type] and reach the ***gra'ah*** [an area without any bushes at all], then turn right and go for about an hour along the edge until you see some ***'ōsaj*** [*Lycium shawii,* a kind of large, dark, shrub]. The camp is just beyond those." Boundaries of area place-names are often marked by shifts in vegetation. The boundaries between the well-known and important grazing tract called al-Ḥabl (centered some 80 km west–northwest of ad-Dammām) and other named areas both to its south and west are marked by a shift in dominant bush type from ***khillah*** to ***ḥamḍ.*** The northeastern coastal tract called as-Sūdah is defined by the presence of ***ḥamḍ*** (saltbush) vegetation in contrast to surrounding areas without it. The place-name refers to the "blackness" of such bushes when they are in winter dormancy or to the dark green color of their succulent foliage in summer or to both.

Individual plant species may also provide guidance in choosing routes through difficult terrain. Āl Murrah guides taught me to avoid spots with ***gaṣbā,*** the perennial grass *Centropodia forsskalii,* while driving a motor vehicle in heavy dune country. That plant marks places where dune sand stratification of former slip faces is nearly vertical, leading to very soft spots in which cars are liable to get stuck. This tip is doubtless a bit of plant-topographical lore that has been passed on from a time when travel was exclusively by camels and thus would have been just as useful in helping to avoid difficult going.

Plant names also occur rather frequently in the specific names of places, These "plant place-names" sometimes refer to an area where the plant referent is widely abundant, but sometimes to where it is rare and unusual and thus noteworthy. A common formula for such names is the creation of a feminine noun by attaching to the plant name the relative adjective *(nisbah)* suffix *-īy,* which is in turn linked to the marker of the feminine singular -*ah* or plural -*āt.* Some examples from our study area include:

al-Ḥarmalīyah, from ***ḥarmal,*** the name of the shrublet *Rhazya stricta* (Apocynaceae). A hill and settlement about 80 km south of the al-Ḥasā oasis.

al-Ḥuwaydhīyah, from the diminutive form of ***ḥādh,*** the name for the shrublet *Cornulaca monacantha* (Chenopodiaceae). A group of hills 50 km south of the al-Ḥasā oasis.

al-Ḥamāṭīyāt, from ***ḥamāṭ,*** the name for the small perennial *Moltkiopsis ciliata* (Boraginaceae). A series of seasonal water courses in the vicinity of the Saudi Arabia–Kuwait border.

The masculine adjectival form is less common:

al-Khuzāmī, from ***khzāmā,*** the name for the annual *Horwoodia dicksoniae* (Cruciferae). A well about 170 km west of Dhahran.

As noted earlier, plant names may also be coupled with the parental terms ***abū*** or ***abā,*** "father," and ***umm,*** "mother," to form a name denoting a place where a certain plant is found:

Abā al-ʻAbal, from ***abā,*** "father [of]," + ***al-ʻabal,*** "the ***ʻabal*** shrub," *Calligonum comosum* (Polygonaceae). A well 50 km west of Dhahran.
Umm al-ʻĀdhir, from ***umm,*** "mother [of]," + ***al-ʻādhir,*** "the ***ʻādhir*** bush," *Artemisia monosperma* (Compositae). A well in the same general area as Abā al-ʻAbal.

Plant names may also be linked with a topographic term to make a specific place name:

Barqā' aḍ-Ḏumrān, from ***bargā,*** "a broad hill with sand banked along its sides," + ***aḍ-ḍumrān,*** for the shrublet *Traganum nudatum* (Chenopodiaceae) (with definite article). An elevated area 55 km southwest of the al-Ḥasā oasis.
Mishāsh Abū al-ʻIkrish, from ***mishāsh,*** "shallow, hand-dug water well," + ***abū,*** "father [of]" + ***ʻikrish,*** for the grass *Aeluropus lagopoides.* A well 105 km southwest of al-Ḥasā Oasis.
Rās Abū Muraykhah, from ***rās,*** "headland, cape," + ***abū,*** "father [of]" + ***muraykhah,*** diminutive singular of ***markh,*** for the shrub *Leptadenia pyrotechnica* (Asclepiadaceae). A gulf coastal headland 12 km northwest of Ras Tanura.
Rijm ash-Shinānah, from ***rijm,*** "stone marker cairn," + ***ash-shinānah,*** for the ***shinān*** or ***shnān*** bush *Seidlitzia rosmarinus* (Chenopodiaceae) (with definite article). A high point on the eastern edge of the Dahnā' sand belt near the Khurais oil field.
Jabal Dawmat al-ʻArād, from ***jabal,*** "hill," + ***dōmah(t)*** (meaning is uncertain) + ***al-ʻarād,*** "the ***ʻarād*** bushes," *Salsola cyclophylla* (Chenopodiaceae). A rocky hill 70 km southwest of an-Nuʻayrīyah.
Jabal Nufayl, from ***jabal,*** "hill," + ***nfēl,*** diminutive of ***nafal,*** for the leguminous annual *Trigonella stellata.* A hill 50 km west of al-Jubayl.
Jaww ash-Shanāyin, from ***jaww,*** "valley, hollow," + ***ash-shanāyin,*** plural of ***shinān, shnān,*** for the chenopodiaceous shrublet *Seidlitzia rosmarinus.* A low area 35 km southwest of Abqaiq.

A few place-names are simply a plant name, usually in singular form, without additions except the definite article:

al-Qayṣūmah, from ***al-gēṣūmah,*** "the ***gēṣūm*** bush," *Achillea fragrantissima* (Compositae). A pump station and settlement on the Trans-Arabian Pipeline, near the northwestern edge of our core study area. "Al-Qayṣūmah" was originally the name of a slight depression in the vicinity that had ***gēṣūm*** bushes on its silty floor. The name was applied there because of an exceptional occurrence of a plant commonly found only well northwest of this area.

as-Sudayrah, from ***as-sdērah,*** "the little ***sidr*** tree" (singular diminutive), *Ziziphus spina-christi* (Rhamnaceae). A well 25 km south of an-Nuʿayrīyah.

ar-Rākah, from ***ar-rākah,*** "the ***rāk*** shrub" (singular), the shrub *Salvadora persica* (Salvadoraceae), in this case marking "the place where ***rāk*** grows." A suburban area between ad-Dammām and al-Khubar. The place-name refers to the growth of ***rāk*** there in former times, the shrub used to make toothbrushes. The same name is used for two other places in eastern Saudi Arabia, where ***rāk*** still grows.

Plant-related topographic terms may also be coupled with a nonplant modifier acting something like a specific epithet in naming a place or area:

Marbakh al-Faras, from ***marbakh,*** "sand area with many bushes," + ***al-faras,*** "the mare," forming a name meaning "***marbakh*** of the mare." An area in the northern Rubʿ al-Khālī.

Qīẓān al-Maqran, from ***gīẓān,*** pl. of ***gōz,*** "sand area with ***ghaḏā*** shrubs," *Haloxylon persicum* (Chenopodiaceae), + ***al-magran,*** "place of hornlike knobs." An area in the northern Rubʿ al-Khālī.

Generics and Subgenerics

A Descriptive List

THIS CHAPTER GIVES a list of all folk generic and subgeneric names arranged under the broader folk categories that include them. A list of the same plants arranged by scientific plant families can be found as appendix C on the CD inside the back cover of this book. The presentation here is given according to the following outline, with groups listed in the numerical order indicated:

1. Life form ***shajar***$_1$ (all perennials)
    2. Sub–life form ***shajar***$_2$ (true trees and shrubs taller than man height)
        3. Intermediate: ***‘iḏāh*** (trees and large shrubs with thorns)
    4. Sub–life form ***shima‘*** (bushes well shorter than man height)
        5. Intermediate ***ḥamḏ*** (saltbushes)
            6. Complex ***ṭahāmīj*** (salt marsh succulents)
        7. All non***ḥamḏ*** bushes
            8. Intermediate ***khillah*** (non***ḥamḏ*** bushes often browsed by livestock)
            9. Non***ḥamḏ*** bushes seldom or never browsed by or unimportant for livestock
    10. Residual group of perennials smaller than bush size
11. Life form ***‘ishb*** (all annual plants)
12. Unaffiliated generics
13. Generics of unknown life form

Within each category, the arrangement is English alphabetical, ignoring diacritical marks. Folk specifics, when present, are listed under their respective generics. Constituents of each entry are:

1. The folk generic name followed in parentheses by the name(s) of the tribe(s) of the consultants who provided the name. The abbreviation *gen.* in parentheses (gen.) indicates a name known with some confidence to

be in general use by multiple tribes of the study area. The provision of a tribal source for a name, however, does not preclude the possibility that the name might be in more general use.

2. For analyzable names, an English gloss of the lexeme and its constituents. In some cases, I have also added a discussion of the generic or subgeneric name's range of application. Variants and synonyms are listed, with glosses when analyzable. In general, forms based on the same linguistic root are called *variants;* those from different roots are called *synonyms.*
3. The scientific names of the taxon or taxa concerned and the botanical family. These names are followed by a listing of the author's specimen numbers with standard herbarium designators for their locations: BM, Natural History Museum, London; DAO, Agriculture and Agri-Food Canada, Ottawa; E, Royal Botanic Garden, Edinburgh; K, Royal Botanic Gardens, Kew, U.K.; LE, Komarov Botanical Institute, Leningrad. Specimen numbers without herbarium designators are in the author's personal herbarium. The number of specimens cited for each taxon is limited to a maximum of three, although the number of collections for the majority of species is considerably greater.
4. A brief description of the plant or plants, generally a shortened version of the technical botanical description in Mandaville 1990.
5. A brief mention of the cultural significance of the folk taxon when applicable. More detailed cultural information is found in other sections of this study.
6. References to any illustrations of the plant in this book, including illustrations in the accompanying CD. Illustrations numbered "CD" (e.g., "CD.271") are found only on the CD in the back pocket and not in the printed pages. A few illustrations are found in both text and CD.

Arabic names taken from the literature are rewritten in my transliteration system and thus have spellings that in most cases do not match the originals. Scientific nomenclature in older literature references has been updated to currently preferred forms, but without, in many cases, citation of the originals or of other synonymy.

It should be noted that most generics here are in the form of the Arabic *nomen generis,* the collective form regularly used for plant and some animal names. The singular (or technically the *nomen unitatis*) is formed by adding the feminine singular suffix ***-ah.*** Thus, ***athl*** refers to the tamarisk tree *Tamarix aphylla* in general as a "kind," and ***athlah*** refers to a single

tamarisk tree. A few names (such as ***msēkah***, ***gṭēnah***) tend to carry the ***-ah*** suffix in both collective and singular forms. There is some ambiguity about the vocalization of a few names that historically, in classical Arabic, have *-á* terminations (the *alif maqṣūrah*) on forms based on "strong" triliteral or quadriliteral roots, such as *khuzāmá, shiqārá, ʻalandá.* I generally heard such terminations as a simple short *-a,* but there were indications sometimes of a lengthening, particularly from Āl Murrah consultants. In some cases, I tested the suffix by asking consultants for the dual form ("How do you say two of them?"), in answer to which the suffix ***-ah*** changes to ***-tēn***, and the suffix ***-ā*** or *-á* becomes ***-wēn*** or ***-yēn***). In some cases, ambiguity remains, and I write these few such terminations as a simple ***-a.***

1. Life form: ***shajar***$_{1}$ (perennial plants, often woody)
2. Sub–life form: ***shajar***$_{2}$ (true trees and large shrubs)

athl (gen.). The widely used and stable name ***athl*** refers to only one species of tamarisk.

Tamarix aphylla (L.) Karst. Tamaricaceae. 1091. It is a cultivated tree, usually with a well-developed trunk up to 15 m or more high, found around settlements or sometimes desert wells. It may persist for years at abandoned settlements. The leaves are greatly reduced and vaginate, without normal blades. The flowers are pink, in racemes usually 4–6 cm long. The fruits or flowers have been reported used in dyeing cloth (fig. CD.317).

khirwaʻ (Banī Hājir), *Ricinus communis* L. Euphorbiaceae. This plant, the well-known source of castor oil in other parts of the world, is an erect, glabrous, shrublike herb up to 5 m tall. The leaves are alternate, peltate, 10–50 cm across and palmately 5–11 lobed, the lobes being ovate-lanceolate and acute. The greenish yellow flowers are about 2 cm wide, in racemes, and the fruit is an ovoid capsule 1–3 cm long and covered with thick prickles or spines. It is not a plant of the desert, but it is known to some Bedouins.

markh (gen.), *Leptadenia pyrotechnica* (Forssk.) Decne. Asclepiadaceae. 235, 1957. This ascending, dense, many-branched shrub may be encountered in the gulf coastal districts of the study area and is found more widely in the more southerly and western parts of the Arabian Peninsula. It grows 1.5–3(5) m high, with green, wandlike

branches, and is virtually leafless except for small, soon deciduous rudiments on young spring growth. The flowers are yellow-green, subsessile, clustered in short axillary cymes; the fruits are terete, linear, striate, 9–13 cm long, and about 0.8 cm wide with comose seeds. Both the flowers and young fruits are edible, and the hair tufts on the seeds were formerly collected and used for tinder in making fire with flint and steel (fig. CD.224).

'ōsaj (gen.). Two name variants recorded from informants of northern tribes are ***'ōshaj*** and ***'ōshaẓ.*** The name applies to two very similar species of *Lycium* (Solanaceae), the second of which, *L. shawii*, is the more common.

Lycium depressum Stocks. BM 3126. This dense, glabrous shrub is 1.5–3.5 m high with many rigid branches that become more or less spinescent. The leaves are clustered, obovate-oblong to spathulate, 1–3(4) cm long, 0.3–0.8(1) cm wide, and the flowers are mostly in clusters of 3–8 on pedicels 3–10(15) mm long, with pale violet, funnel-shaped corollas 8–10 mm long. The stamens are equal or subequal and clearly exserted from the corolla. The fruits are globose, orange-red berries 4–6 mm in diameter (fig. CD.228).

Lycium shawii Roem. et Schult. BM 1108, BM 1205. The habit and leaf characters of this dense, stiff-branched, intricate shrub resemble those of *L. depressum*. Its flowers differ, however, being solitary or rarely two together, 13–16 mm long, with the corolla narrowly tubular and variably white through pink to purple. The stamens are distinctly unequal and included or with two of them somewhat exserted. The berries are globose, red, and about 4–5 mm in diameter (figs. CD.229–231).

Both of these plants have edible berries, called ***dōm*** (Banī Hājir), and both have supernatural associations, being considered by some to be the abode of the non–human beings called ***jinn.***

rāk (gen.), *Salvadora persica* L. Salvadoraceae. BM 2959. This large shrub with opposite branches, 1–5 m high, often grows in dense thickets on sand hummocks. It is rare in our area but rather more common in southeastern and southwestern Arabia. The leaves are elliptical or broadly lanceolate, entire, 2–5 cm long and 1–2 cm wide, on petioles about 5 mm long; the flowers are about 3 mm long in paniculate racemes and have a coffeelike odor. The fruits are

globular, fleshy, reddish, and 3–6 mm in diameter. The roots (and apparently sometimes the stems) are used for making toothbrushes, and the fruits are eaten by tribes of the southern Rub‘ al-Khālī (figs. 4.12, CD.289–291).

shibhān (Āl Murrah). Synonyms are ***ṭirf*** (al-‘Awāzim tribesmen at Thāj, possibly a suprageneric term) and ***ghāf*** (villagers of al-‘Uyūn, al-Ḥasā oasis), the latter a name regularly used for a very similar plant, *Prosopis cineraria* (L.) Druce*,* found in southern and southeastern Arabia but not occurring within the strict limits of our study area.

Prosopis koelziana Burkart. Leguminosae. BM 1048, BM 2896, BM 3949. This large shrub to good-size tree is 2–12 m high, scrubby or erect with a well-defined trunk. The branches are somewhat pendulous, with sharp prickles or unarmed. It seems to be found in our study area at points on Hellenistic period caravan routes from southern Arabia; it may have been brought in with caravan traffic from that region in early times (figs. CD.267, CD.268).

ṭarfā (gen.). This well-known name is applied to six species of *Tamarix* (Tamaricaceae), all characterized by their wild habit and shrubby form without boles and thus considered distinct from ***athl,*** the cultivated *T. aphylla*. All of these shrubs grow 1–3(5) m high, are very similar to each other in general appearance, and are separated scientifically mainly by flower and fruit characters. They all have leaves reduced to clasping, pointed scales, thus appearing to have jointed “needles” rather than normal twigs and leaves (fig. CD.318).

T. arabica Bge. DAO 3942, DAO 7846, DAO 7864. This large shrub, with brown or red branches and leaves clasping with triangular blades, has pale pink to white flowers with five stamens and in dense racemes 1.5–4 cm long. The fruits are pyramidal, tapering to apex and about 3 mm long.

T. aucheriana (Decne.) Baum. DAO 7443. This shrub has brown to purplish branches and flowers that are pink to white, with twelve to thirteen stamens, and in spiciform racemes 2–5 cm long. The fruits are pyramidal and 4–6 mm long.

T. macrocarpa (Ehrenb.) Bge. DAO 7448. This shrub has brown to gray-purple branches and flowers that are pale pink, with ten stamens, and growing in dense or somewhat open spiciform racemes 2–6 cm long.

T. mannifera (Ehrenb.) Bge. DAO 7817A, DAO 7856. This shrub, with brown to red-brown branches, has flowers that are pink to white, with five stamens, and in dense racemes 0.7–3 cm long.

T. pycnocarpa DC. BM 1459, DAO 7092. This shrubby *Tamarix* with gray-brown to gray-purplish branches is usually easy to identify by its large flowers and fruits. The flowers are pink-rose with twelve to fifteen stamens, rather showy, and sometimes up to 20 mm broad in fruit; the fruits are 8–12 mm long.

T. ramosissima Ledeb. K, DAO 531, BM, DAO 1457, BM 650. This large shrub with gray-purplish branches often forms large hummocks in sand terrain. The flowers are white to pink, with five stamens, and in racemes 2–5 cm long. The fruits are 2.5–4 mm long.

The ashes of any of the previous six species are used in treating camel mange.

'ushar (gen.). A Qaḥṭānī informant pronounced this name ***'isharr,*** with stress on the second syllable.

Calotropis procera (Ait.) Ait. f. Asclepiadaceae. BM 1080. This striking ascending to erect, treelike, glaucous shrub is woody below with pale, corky bark; it is coarsely succulent-herbaceous above, to 4(5) m high; and it bleeds copious latex at any wound. The leaves are opposite, oblong or obovate, sessile, 10–25 cm long, and 8–17 cm broad. The flowers are greenish white and purple flushed, 1.5–2 cm across (3 cm with corolla lobes spread), in umbel-like, peduncled cymes; the fruit is an ovoid follicle 8–13 cm long with comose seeds. This plant is toxic and is used medicinally and for charcoal in the making of gunpowder (fig. CD.106).

1. Life form: ***shajar***$_1$ (perennial plants, often woody)
2. Sub–life form: ***shajar***$_2$ (true trees and large shrubs)
   3. Intermediate category: ***'iḏāh*** (spiny trees and spiny large shrubs)

salam (gen.). Tribes of the southern Rub' al-Khālī (speakers of a non-Najdī dialect) use the synonym ***ḥardhā,*** pl. ***ḥarādhī*** (Āl Rāshid) for the name of this by far the most common *Acacia* of our study area.

Acacia ehrenbergiana Hayne. Leguminosae. BM 2113, BM 2153, BM 2748. This large shrub or small tree usually has multiple ascending branches from the base and in the study area grows 2–4 m

high. It has straightish, white spines 2–5 cm long, and its compound leaves have only one to two pairs of pinnae; the 2–3 mm long leaflets are in six to nine (or ten) pairs. The flowers are yellow, in globular heads, and the pods are up to 10 cm long, falcate, and constricted between the seeds (figs. CD.46–48).

samur (gen.), *Acacia tortilis* (Forssk.) Hayne. Leguminosae. 8381. This large shrub or small tree is usually flat topped with several main branches ascending from the base. It has spines often in alternating pairs of longer (1–3 cm) straight ones and shorter curved ones, and the leaves have pinnae mostly in four to six pairs and leaflets in six to ten pairs. Its flowers are pale yellow, in globular heads, and the pods are more or less spirally coiled and contorted, torulose, weakly compressed, and 3–9(10) cm long (when straightened).

sidr (gen.). This name is applied to two species of *Ziziphus* (Rhamnaceae), the first a large woody shrub of inland silt basins, the second a large tree seldom seen outside cultivation.

Ziziphus nummularia (Burm. f.) Wight et Arn. 504, 2746, 8383. This ascending, many-branched spiny shrub, more or less rounded in outline and 1–3 m high, has stipular spines that are dimorphic: one straight, to about 1 cm long, and the other hooked. The leaves are ovate to orbicular, 0.8–2 cm long and 0.5–1.8 cm wide. The flowers are axillary, greenish yellow, 3–4 mm long; the fruit is a globose reddish drupe 7–8 mm in diameter. This shrub has been used for making camel sticks. In some parts of northern Arabia, it is said to be one of the abodes of the ***jinn*** (figs. CD.330, CD.331).

Ziziphus spina-christi (L.) Willd. BM 7004. This tree grows up to about 12 m high; it may be spiny or unarmed and has pale gray branchlets. The leaves are ovate to oblong, 2.5–6 cm long and 1.5–4 cm wide. The flowers, growing about three to eight together in axillary cymes, are yellowish green and 4–6 mm in diameter. The yellowish fruit is an ovoid or globular drupe, 0.8–1.5 cm in diameter. The fruits, called ***nabag,*** are edible. The wood is sometimes used in village construction or crafts, and the dried leaves are powdered and used as a shampoo or for other washing purposes.

ṭalḥ (gen.). The name ***ṭalḥ*** is applied to two species of *Acacia* (Leguminosae) in our area, where the genus is poorly represented compared to country farther west and south, particularly in the Ḥijāz

Mountains of the western parts of the peninsula. Both species tend to have large and well-defined boles and are a larger size and thus form a natural subgroup of our four eastern *Acacia* species.

Acacia gerrardii Benth. subsp. *negevensis* Zoh. BM 586. This tree grows to 3–10 m high and has whitish, straight spines 2–5 cm long and sometimes reduced to hornlike spinelets 3–5 mm long. The leaves have three to nine pinnae pairs, and there are usually ten to eighteen pairs of leaflets, each 3–4 mm long. The flowers are pale yellow to white, in globular heads, and the pods are falcate, not constricted, compressed, and 6–12 cm long.

Acacia raddiana Savi. BM 1878, BM 2112, BM 2162. This tree usually has a distinct bole and a rounded irregular crown. It seldom exceeds 4 m in our study area but can reach 7 m or more high in central Arabian wadi situations. Its spines are white, 2–5 cm long, and the leaves have pinnae in two to six pairs with leaflets mostly in six to ten pairs and 2–3 mm long. The flowers are pale yellow to white, and the pods are usually strongly contorted, light reddish to brown, 5–12 cm long (when straightened), and slightly constricted between the seeds. I found one of these trees to be a fairly copious producer of gum arabic, ***ṣamgh,*** although I have no evidence of local exploitation (Figs. CD.49, CD.50).

1. Life form: ***shajar***$_{1}$ (perennial plants, often woody)
4. Sub–life form: ***shimaʿ*** (bushes shorter than man height)
    5. Intermediate: ***ḥamḏ*** (saltbushes)

ʿarād (gen.). Cf. classical *ʿard,* "hard, thick, stiff"; the plant has hard, thick branches.

Salsola cyclophylla Bak. Chenopodiaceae. BM 327, BM 2932, BM 3191. This intricately branched shrublet usually grows 10–50 cm high but is sometimes dwarfed, although it is always woody at base. The leaves are suborbicular and crowded into budlike knots; the flowers are in very dense, short lateral spikes 5–15 mm long and 3–7 mm in diameter. The fruiting perianth is 3–5 mm in diameter, including the wings (fig. CD.286).

ʿaṣal (gen.), *Suaeda monoica* Forssk. ex J. F. Gmel. Chenopodiaceae. BM 1016. This shrub can grow to more than 2 m high in central Arabia but is generally smaller in our area. It is densely leafy, sometimes

with drooping branches. The leaves are linear, succulent, mostly 15–20 mm long and about 2 mm wide, flattened on both surfaces, and approximate. The flowers are axillary in loose, leafy spikes, and the fruit perianth is 1–2 mm long and reddish when ripening. This bush is known from only one site in our area, in the northern Rub‘ al-Khālī, a place considered haunted by ***jinn***. It is more common southwest of our study area and in western Arabia (figs. CD.314, CD.315).

ḍumrān (gen.). Cf. classical *ḍamar,* "to be thin, slender" + ***-ān,*** denoting a likeness, thus "slender bush." The name probably refers to this shrub's slender, wandlike branches.

Traganum nudatum Del. Chenopodiaceae. BM 324, BM 2943, BM 2957. This diffuse shrub, 20–60 cm high, has glabrous, whitish, rather virgate branches. The sessile leaves are triangular-lanceolate, subtriquetrous, and distant; they are also somewhat fleshy and up to 8 mm long, often decurved, and usually with two smaller, rounded bracts at their bases. The inconspicuous flowers are sessile in the densely short-woolly axils. This shrub is a favorite browse plant for the camel (fig. CD.323).

gaḍgāḍ (Āl Murrah, ‘Ujmān, ad-Dawāsir). A member of the Ruwalah made the application to the second species, *Salsola jordanicola.*

Halothamnus iraqensis Botsch. Chenopodiaceae. K 510, BM 3827, 8701. This ascending, much-branched, and virtually glabrous shrublet usually grows to 20–50 cm high. The leaves of the spring season are fine-linear and 3–15 mm long; those of summer and autumn are reduced to triangular rudiments. The flowers are in spikes, developing rather showy, yellowish or rosy pink fruiting perianths 12–15 mm in diameter (figs. CD.191, CD.192).

Salsola jordanicola Eig. Chenopodiaceae. BM 512, K 508. This much-branched shrublet grows to 15–60 cm high with long-triangular to linear-pubescent leaves that are 2.5–10 mm long and 0.4–0.7 mm wide. The leaves may grow longer in spring, and spring flowers are axillary, in loose spikes up to about 12 cm long; autumn flowers are often shorter and more congested. The fruiting perianth is 5–9 mm wide, including the straw yellow or pinkish wings.

garmal (gen.), *Zygophyllum simplex* L. Zygophyllaceae. K 372, BM 3179. This dense, procumbent, succulent perennial (sometimes

perhaps annual) grows to about 30 cm across. Its leaves are simple, sessile, succulent ovoid to cylindrical, and 3–15 mm long; the yellow flowers are mostly solitary in the axils and 4–5 mm across. The fruits are obovoid to subglobose capsules that become angled and 2–3 mm long (fig. CD.335).

gaṭaf (Banī Hājir). This generic applies to two very similar species of *Limonium* (Plumbaginaceae) found on saline ground in or near coastal salt marsh.

Limonium axillare (Forssk.) O. Kuntze. BM 3807, 7093. This ascending shrublet is 10–50 cm high, with oblanceolate to spathulate gray-green leaves that are mostly 4–8 mm wide, up to 4.5 cm long, minutely punctate, and dotted white with excreted salts. The flowers are in dense spikelets in paniculate inflorescences, and the bracts are reddish with white margins. The corolla is purple but soon deciduous, leaving the white calyx (fig. CD.225).

Limonium carnosum (Boiss.) O. Kuntze. 7080, 8659. This second coastal *Limonium* can be recognized by its narrower leaves. It is an ascending to suberect perennial up to 40 cm high, woody at base. The leaves are grayish green, linear-spathulate to cuneate, mostly 0.5–2 cm long and 1–3 mm wide, somewhat fleshy, and covered with crystals of excreted salt. The flowers are in spicate panicles with corollas white to pale pink; they are also deciduous and about 4.5 mm long.

ghaḍā (gen.), *Haloxylon persicum* Bge. Chenopodiaceae. BM 322, 7026, 7599. This large shrub or small tree grows 1.5–3(4) m high with a thick woody base, sometimes with drooping terminal shoots. The leaves are greatly reduced, the stems appearing naked, cylindrical, and jointed. The flowers are in short lateral spikes, and the fruiting perianth is about 8 mm across, including the spreading membranous wings. This shrub is important for camel grazing and as a source of excellent firewood (figs. 1.3, CD.3, CD.23, CD.193, CD.194).

gurm (Banī Khālid, Banī Hājir), *Avicennia marina* (Forssk.) Vierh. Verbenaceae. BM 1102, 7811. This mangrove, found in the intertidal zone in a few protected bays of the gulf coast, is an erect-ascending shrub or small tree, 1–3 m high. The entire leaves are opposite, lanceolate to elliptical, 3–7 cm long, and 1–3 cm wide.

The flowers are in dense, capitate cymes with a yellow corolla that exceeds the calyx and with four subequal spreading lobes. The capsule is almond shaped, 1.5–2.5 cm long. The mangrove is sometimes browsed by camels of coastal tribes, and its capsules are used medicinally.

ḥādh (gen.). The name is applied to two species of *Cornulaca* (Chenopodiaceae): in the south, by tribesmen frequenting the Rubʿ al-Khālī, to *C. arabica*; farther north, among tribes that do not enter the southern sands, to *C. monacantha*. Southerners who know both species use the diminutive variants ***ḥuwēdhān*** and ***huwēdhdhān*** (Āl Murrah) for *C. monacantha.*

Cornulaca arabica Botsch. (considered by some botanists to be conspecific with *C. monacantha*). K 467, BM 1018, LE 1934. This rounded, gray-green, tangled, and many-branched shrub is 30–80 cm high with triangular, pungent, clasping leaves 1.5–4 mm long. The flowers are solitary or few in the axils, and the fruit is subpyramidal, 3.5–4.5 mm long, with two subequal hornlets or spinelets 0.5–1 mm long and hidden in dense white hairs. This shrub is an important grazing plant of the Rubʿ al-Khālī, where it is endemic (figs. CD.15, CD.17–19, CD.128).

Cornulaca monacantha Del. BM 642, BM 1136, LE 1932. This many-branched, glabrous, prickly shrublet is 10–40 cm high with clasping leaves that are triquetrous, 3–10 mm long, spiny tipped, and short-woolly in the axils. The flowers are clustered in the upper axils, and the fruits have one or two clearly exserted spines 4–6 mm long (fig. CD.129).

ḥamḏ al-arnab (Āl Murrah). From ***ḥamḏ,*** "saltbush," + ***al-arnab,*** "the hare," thus "saltbush of the hare." A Rāshidī consultant of the southern Rubʿ al-Khālī (a speaker of southern Arabic) used the name ***ṭiḥyān*** for this plant.

Halothamnus bottae Jaub. et Spach. Chenopodiaceae. BM 1052, LE 1132. This ascending, many-branched shrublet, 10–30 cm high, has a characteristic blue-green grayish color when in active growth. The leaves are reduced to triangular-triquetrous, subclasping rudiments 0.5–1.5 mm long. The flowers are mostly solitary in the axils and distant; the fruits, including the wings, are 4–8 mm across (figs. CD.189, CD.190).

harm (gen.). The generic ***harm*** is applied to three species of *Zygophyllum* (Zygophyllaceae).

Zygophyllum mandavillei Hadidi. BM 2892, BM 3999, BM 4006. This ascending, many-branched, highly succulent shrub is mostly glabrous and grows to about 80 cm high. The very succulent leaves are predominantly monofoliolate but sometimes bifoliolate in seedlings or fresh growth, subcylindrical, 4–15 mm long, and 2–3 mm wide. The flowers are solitary, about 4.5 mm long, with white, spathulate petals, and the capsules are club shaped, circular in cross-section, 12–20 mm long, and 3–7 mm wide. This shrub is an endemic of the Rubʿ al-Khālī and adjoining sands, where it is sometimes grazed by camels even though it is generally considered mediocre fodder (figs. CD.16, CD.332, CD.333).

Zygophyllum migahidii Hadidi. BM 7440, BM 7442, BM 7445. This ascending, much-branched succulent shrublet grows to about 75 cm high and has grayish tomentose foliage. All or most of the leaves are predominantly bifoliolate, succulent, cylindrical or somewhat compressed to ovoid, and 2–15 mm long. The flowers are mostly solitary, 4–5 mm long, with white or yellowish petals; the capsule is cylindrical to somewhat obconical, five angled, truncate or retuse and weakly lobed at the apex, and 8–13 mm long.

Zygophyllum qatarense Hadidi. BM 7460, BM 7496, BM 7492. This ascending, many-branched succulent shrublet grows to about 75 cm high and sometimes becomes yellowish or reddish in overall color. The leaves are monofoliolate, succulent, terete, cylindrical to ovoid, and 3–8 mm long. The flowers are solitary with whitish petals, and the capsules are cylindrical or obscurely obconical, weakly five angled, truncate at the apex, 4–9 mm long, and 3–6 mm wide. Camels sometimes eat it, but it is not generally considered a good grazing plant (fig. CD.334).

khiḏrāf (northern tribes), *Salsola volkensii* Aschers. et Schweinf. Chenopodiaceae. BM 314, 7452, 8809. This erect or ascending and somewhat fetid annual, 10–40 cm high with erect white hairs, is blue-green when fresh. The leaves are sessile, linear, and 3–6 mm long, smaller in summer. The flowers are in spikes, and the winged fruiting perianth is 7–10 mm across. The plant is rather rare in the study area, found in the north and sometimes on disturbed ground.

It is usually described as an annual but lives well into the summer and has the aspect of a small bush (fig. CD.288).

khirrēṭ (gen.). A member of the Muṭayr tribe gave the nondiminutive, nonintensive variant ***kharīṭ.***

Salsola baryosma (Roem. et Schult.) Dandy. Chenopodiaceae. BM 3817, BM 3118, LE 1942. This ascending shrublet, 30–60 cm high, is glabrescent or mealy or may be softly pubescent when young. The leaves vary seasonally, being linear and hairy in spring but becoming suborbicular and minute in summer and autumn. The flowers are in dense spikes 10–100 mm long and 5–10 mm wide; the fruiting perianth is 4–6 mm across, including the wings. The fresh plant is somewhat fetid, with an odor sometimes described as "fishy." One Bedouin took me aside and said that "some say this bush smells like a woman" (fig. CD.285).

rimth (gen.). ***Rimth*** is one of the few plant names I have found used as a component in Bedouin male personal names; the father of a well-known desert guide of the ʻUjmān tribe whom I knew personally was called Rimthān ***(rimth*** + ***-ān),*** "resembling ***rimth.***" His name was later given to an oil field of the Arabian American Oil Company (now the Saudi Arabian Oil Company).

Haloxylon salicornicum (Moq.) Bge. Chenopodiaceae. BM 325, BM 2938, LE 1949. This diffuse, rounded, many-branched shrub, usually 60–100 cm high, often grows on sand hummocks that accumulate at its bases. The leaves are virtually absent, reduced to minute scales forming cupules at articulations of the cylindrical stems. The flowers are in dense terminal and lateral spikes, and the fruiting perianth has five conspicuous, membranous yellow or pink wings. It is a very important salt-grazing plant for camels and is dominant in a shrub community covering wide areas in eastern Arabia (figs. CD.9, CD.10, CD.12, CD.195, CD.196).

rughl (gen.), *Atriplex leucoclada* Boiss. Chenopodiaceae. BM 240, LE 2953, LE 2926. This ascending shrub, 20–80 cm high, is pale greenish or, when drier, yellowish mealy-canescent. The deltoid, sinuate-dentate leaves are up to about 2.5 cm long but smaller in summer and autumn. The flowers are both axillary and terminal, with fruit valves incised-dentate and about 4.5 mm long and broad (fig. CD.92).

rūth (Muṭayr, Ruwalah), *Salsola vermiculata* L. Chenopodiaceae. BM 3093, BM 3907. This much-branched shrublet, 15–60 cm high, has fine-sublinear, pubescent leaves 2.5–10 mm long and only 0.4–0.7 mm wide. The flowers are axillary, forming loose spikes up to 12 cm long, and the fruiting perianth is 5–9 mm wide, including the yellow or pinkish wings. ***Rūth*** is considered a very important grazing plant for camels in northern Arabia, where it is found in some of the large wadis (fig. CD.287).

sha'rān (gen.). From ***sha'r,*** "hair," + ***-ān,*** "resembling," thus "hair-like" bush, probably in reference to the terminal bristles often seen on the modified leaves of this plant. The variant ***sha'r*** was recorded from northern informants of the Ruwalah and Sharārāt tribes.

Anabasis setifera Moq. Chenopodiaceae. BM 2928, BM 2940. This glabrous, succulent shrublet grows 10–30 cm high with erect, jointed stems. The leaves are opposite, club shaped, succulent, 3–9 mm long, and sometimes terminating in a deciduous bristle. The fruit perianth has five wings that are often laterally compressed (fig. CD.60).

shnān, shinān (gen.). The northern synonym ***duwwēd*** was recorded from Sharārāt and northern 'Anazah consultants. It is an intensive, diminutive form from ***dūd,*** "worm," thus "little worm bush" in reference to the terete, wormlike, succulent leaves.

Seidlitzia rosmarinus Ehrenb. ex Bge. Chenopodiaceae. BM 321, BM 2956, LE 1962. This rounded, glabrous shrub up to about 80 cm high is often found on raised hummocks on saline flats. The branches are mostly opposite, often white glossy. The leaves are opposite, terete, succulent, club shaped, and about 18 mm long; the fruiting perianth is about 10 mm across, including the unequal wings. The dried and pounded leaves are used as a soap substitute (fig. CD.305).

sillaj (Āl Murrah). The variant ***sillēj*** was recorded from a consultant of the Qaḥṭān tribe.

Cornulaca leucacantha Charif et Aellen. Chenopodiaceae. K 464, BM 1135, BM 1895. This coarse, very prickly, erect to ascending annual or perennial herb grows to 10–30 cm high. The leaves are 4–6(9) mm long, partially clasping, and very prickly; each of the fruits has a single spinelet about 5 mm long.

'ujram (gen.) This generic name is related to the quadriliteral root *' j r m,* which the Bedouins associate with the idea of "being cut, cropped off, on top." The plant is in fact usually flat topped in appearance. Synonyms include: from Āl Murrah, ***'ujērimān*** (diminutive form + ***-ān***); from ash-Sharārāt in the north, ***ḥurḏ,*** "alkali bush"; and from Shammar, ***ghaslah,*** "wash bush," in reference to its use as a soap substitute.

Anabasis lachnantha Aellen et Rech. f. Chenopodiaceae. BM 320, BM 2951, 7600. This shrublet, 20–60 cm high, has leaves that are virtually absent, reduced to cupules on the stems, which thus appear jointed. The fruit perianth is 5–7 mm across, including the five spreading, yellow to pink membranous wings that are often compressed transversely to the shoot axis. Bedouins recognize this plant at a glance, although I had problems at first differentiating it visually from ***rimth,*** *Haloxylon salicornicum*, when not in fruit. The leaves, like those of *Seidlitzia,* are used as a soap substitute (figs. CD.58, CD.59).

1. Life form: ***shajar***$_{1}$ (perennial plants, often woody)
4. Sub–life form: ***shima'*** (bushes, shorter than man height)
   5. Intermediate: ***ḥamḏ*** (saltbushes)
      6. Complex: ***ṭahāmīj*** (salt marsh succulents)

harṭallas (Āl Murrah). Synonyms given include ***haṭallas, ghiḏrāf*** (Banī Hājir), ***harṭabīl*** (northern), ***hurṭumān,*** and ***ṭarṭē'*** (Shammar). The variation in the name of this plant, apparently based on roots of as many as five consonants, is very unusual. None of these names appears to be highly specific; they seem to be used for more than one of the highly succulent salt marsh chenopods that are considered poor grazing for camels. A Banī Hājir consultant applied the name ***haṭallas*** also to *Suaeda aegyptiaca* (Hasselq.) Zoh. (listed later).

Bienertia cycloptera Bge. ex Boiss. Chenopodiaceae. K 466, BM 319, 8815. Technically described as an annual plant, ***harṭallas*** is included in this complex by Bedouins of coastal districts. It is an erect, glaucous, very succulent herb 20–50 cm high, with linear leaves mostly 1–3 cm long. The flowers are single or clustered, and the fruit is fleshy-orbicular, berrylike, and surrounded by a

fleshy circular wing. This plant is found on highly saline ground in coastal or inland salt marshes (fig. CD.94).

haṭlas (Banī Hājir). The name ***haṭlas*** is another variant of one of the members of the name group described in the preceding entry. The same Banī Hājir informant applied the closely related form ***haṭallas*** to this plant on a different occasion.

Suaeda aegyptiaca (Hasselq.) Zoh. Chenopodiaceae. BM 237, 1965. This shrubby, densely leafy, glabrous, soft-succulent herb grows to about 60 cm high. It has teretish or somewhat flattened succulent leaves to about 25 mm long. The flowers are clustered in leafy spikes, and the fruiting perianth is top shaped, becoming spongy inflated and green, sometimes ripening to purple or black. The plant is usually found on saline waste ground around settled areas and farms.

khirrēz (gen.). The generic name ***khirrēz*** is an intensive, diminutive form of ***kharaz,*** meaning "string of glass beads," referring to the appearance of the succulent, red, perfoliate leaves "strung" on the stem.

Halopeplis perfoliata (Forssk.) Aschers. et Schweinf. Chenopodiaceae. BM 2925, LE 1936, 3811. This erect, glabrous, succulent shrublet grows to 20–40 cm high, the succulent parts often becoming red in color. The leaves are very succulent, subglobular to pyriform, and perfoliate, giving the stem a swollen, jointed appearance. The flowers are in dense terminal spikes.

shū' (Banī Hājir), *Arthrocnemum macrostachyum* (Moric.) Moris et Delponte. Chenopodiaceae. K 460, LE 1104, 8682. Usually low growing with spreading, decumbent stems, this glabrous, succulent perennial has leaves that are virtually absent, forming small cupules at the stem joints. The flowers are minute, showing as dots in the terminal nodes. This plant is found mainly in coastal salt marshes.

suwwād (gen.). The generic name ***suwwād*** is from the root *s w d,* connoting the idea of "being black" (cf. ***aswad,*** fem. ***sōdā,*** "black"). It is an intensive noun form, thus "that which makes or becomes black." Stands of the plant appear dark, especially when viewed from a distance. This Arabic vernacular name (or its diminutive) was the source of Forsskal's genus name, *Suaeda*. A northern synonym, ***ṭaḥmā*** (of interest in possibly being related to the complex

name ***ṭahāmīj;*** see section 5.3) was recorded from informants of the Ruwalah and Shammar tribes.

Suaeda vermiculata Forssk. Chenopodiaceae. BM 3135, LE 1950, LE, BM 2924. This much-branched succulent shrub grows to 30–80 cm high. The leaves are rather remote, glabrous and succulent, blue-green glaucous, oblong to ovate and flattened above, and 4–15 mm long. The flowers are in axillary, often loose, terminal spikes (fig. CD.316).

thillēth (Banī Hājir). The generic ***thillēth*** is from the root *th l th,* connoting "three" (cf. ***thlāthah,*** "three"). It is an intensive, diminutive form referring to the distinctive way this plant's stems put out shoots in three definite planes along the main stem axis. A synonym used also by Banī Hājir is ***'ujērimān,*** referring to some similarity, perhaps with respect to its flat top, to the shrub called ***'ujram*** *(Anabasis lachnantha).*

Halocnemum strobilaceum (Pall.) M. B. Chenopodiaceae. BM 9, BM 318, 3809. This low, straggling perennial is 15–40 cm high, often procumbent with stems spreading on saline ground. The leaves are rudiments forming opposite, decussate, budlike structures, and flowering branches nearer the extremities are apparently leafless and cylindrical. The flowers are immersed in the nodes with the single stamen exserted, sometimes yellowing the stem with anthers and pollen (figs. CD.187, CD.188).

1. Life form: ***shajar***$_1$ (perennial plants, often woody)
4. Sub–life form: ***shima'*** (bushes shorter than man height)
    7. All non***hamḍ*** bushes
        8. Intermediate: ***khillah*** (non***hamḍ*** bushes important for grazing)

'abal (gen. south), ***arṭā*** (gen. north). The synonym used by speakers of northern Najdī Arabic, ***arṭā,*** is more widely known in classical texts for what is obviously *Calligonum.* Either name, depending on the tribe of the speaker, may be applied to two (probably three) species of *Calligonum* (Polygonaceae) that differ mainly in details of fruit form. The distinctive fringed fruits are called ***natharah*** (Āl Murrah). Interestingly, in 1969 I recorded southern Najdī ***'abal*** from mountain people as a name for the white-flowered and fragrant

Arabian mountain rose, *Rosa abyssinica* R. Br. ex Lindl., collected at an elevation of 2,890 m (9,400 feet) in the highlands of southwestern Arabia. The close cognate *'abāl* is given by the classical botanist Abū Ḥanīfah ad- Dīnawarī (d. ca. A.D. 895) as the name for what he calls *ward al-jabal,* "mountain rose," obviously this mountain plant (Hamidullah 1973, 118). How the name ***'abal*** came to be applied to *Calligonum* of the lowlands is a mystery. The flowers of *Calligonum comosum*, in close view, are roselike (fig. CD.100), but overall the two plants are very different. The answer may lie somewhere in the migrations of southern Najdī tribes such as Āl Murrah from the highlands of the southwest.

Calligonum comosum L'Hér. BM 2139, BM 2725, BM 2857. This ascending shrub may attain about 120 cm in height, and its older branches are whitish. Its leaves are soon deciduous and mostly apparently absent, leaving flexible green shoots. It occurs in two color forms, in which the flowering perianth lobes are white-pink or greenish white with a darker medial stripe, and the fruits are red or greenish yellow, covered in bristles from four wings. It is an important shrub of sandy terrain, furnishing camel grazing and excellent firewood. It is also used for medicine and tanning (figs. CD.99–101).

Calligonum crinitum Boiss. subsp. *arabicum* (Sosk.) Sosk. BM 4001, BM 4004, 7625. This Rub' al-Khālī endemic is an ascending shrub to about 2 m high. It closely resembles *C. comosum,* but its fruit bristles are sparser and do not originate on the wings. It occurs in both reddish and yellowish color forms, like the preceding species. The plant is important for grazing and firewood. Its young shoots are edible, and the plant has been used for tanning (figs. CD.102–4).

The name ***'abal*** (or its synonym ***arṭā***) can be predicted to be used also for *Calligonum tetrapterum* Jaub. et Spach (my specimen 2844), recognizable by its fruit wings without bristles. It appears to be very rare in our study area (fig. CD.105).

'ādhir (gen.), *Artemisia monosperma* Del. Compositae. 3205, 7608, 7918. The question of the possible reassignment of our plants to *Artemisia jordanica* Danin requires further study. This wormwood grows as an ascending, green to silvery green somewhat aromatic shrublet,

glabrous to very finely appressed-silky, 50–100 cm high. The leaves are linear-oblanceolate, solitary or clustered, entire or with linear lobes, 3–7 cm long, and tapering to base. The shrublet's heads are ovoid, 3–4 mm long, with three to six florets, in somewhat one-sided racemes forming an elongate compound inflorescence up to 40 cm long. The plant is characteristic of the red sands of the Dahnā' and is seldom seen outside that habitat, although I collected it 15 km west of the coastal town of al-Jubayl. It is grazed by sheep and camels but is not considered particularly good fodder. It was reportedly used for the tanning (or other treatment) of hides used as water skins.

'algā (gen. south), *Dipterygium glaucum* Decne. Capparaceae. BM 1430, 7615, 8424. This yellowish green, finely scabridulous shrublet grows 30–80 cm high and is nearly leafless in the dry season. It has alternate, oblong leaves 3–12 mm long and yellowish flowers. The fruits are slightly compressed, 3–8 mm long, obovate with wrinkled faces, and winged. It is an important grazing plant in some sandy regions, including the Rub' al-Khālī. Bedouins say that it is the favorite food plant of the ***ḥbārā,*** the houbara bustard *(Chlamydotis undulata),* a game bird hunted with falcons (fig. CD.150).

Scrophularia hypericifolia Wydl. Scrophulariaceae. BM 605, BM 801, 8570. The same name, ***'algā*** (gen. north), is applied to this unrelated plant among tribes of central and northern Arabia. In our core area, I have seen it only in the northern Dahnā' sands. It is an ascending shrublet 30–60 cm high, generally glabrous, and with glossy white intermediate branches. The leaves are alternate or subopposite, elliptical to oblanceolate, and 7–15 mm long. The flowers are in a cymose inflorescence and have dark red corollas 4–5 mm long with whitish lower lobes. The fruit is a depressed-globose capsule about 3 mm long and 5 mm broad. This shrublet is browsed, at least occasionally, by camels (fig. CD.304).

'andab (gen. south). The synonyms ***thundā*** and ***mussē'*** (Shammar) are used among northern tribes. Tribes of the southern Rub' al-Khālī call it ***gaṣīṣ*** (Āl Rāshid, speaking southern Arabic).

Cyperus conglomeratus Rottb. agg. Cyperaceae. BM 2890, 8265, 8358. This perennial sedge has culms to about 60 cm high and narrowly linear, involute-terete, channeled leaves to about 50 cm long. The spikelets are clustered, with tightly imbricate glumes,

and may be up to 50 mm long. It is an important grazing plant in the Rub‘ al-Khālī but is elsewhere considered second-rate fodder. The Shammar tribe reportedly used it in northern Arabia to make cordage (figs. CD.20, CD.140, CD.141).

‘arfaj (gen.), *Rhanterium epapposum* Oliv. Compositae. BM 1756, BM 2709, 2741. A rounded, often hemispherical, intricately branched shrublet, ***‘arfaj*** grows 30–70(100) cm high with white-tomentose young stems. The leaves are sessile and linear, entire or remotely dentate, and 1–3 cm long. The yellow flower heads are numerous, solitary, and terminal. This shrublet is one of the most important grazing plants of our study area, and it is dominant in a plant community covering wide areas, especially in parts of the northern plains (figs. 1.7, CD.4, CD.7, CD.274, CD.275).

arṭā (gen. north). See ***‘abal*** in this list section.

birkān (Āl Murrah, Āl Rāshid), *Limeum arabicum* Friedr. Aizoaceae. BM, K 468, BM 1019, BM 7003. This tangled shrublet, growing to about 50 cm high, is densely covered with minute knobbed glands and is often viscid, with sand adhering to it. The leaves are opposite or subopposite, unequal, ovate to orbicular, about 5 mm long; the flowers are axillary and solitary with white, clawed petals. The fruit splits into two hard, gray-tan mericarps. This species is found on deep sands, particularly in the Rub‘ al-Khālī, where it is a grazing plant.

ḏa‘ah (gen.). A tribesman of Āl Wahībah (non–Najdī Arabic speaking) of the southern Rub‘ al-Khālī used the diminutive form ***ḏu‘ayy;*** a central and northern synonym is ***haḏīd*** (‘Utaybah, Ṣulabah, Qaḥṭān).

Lasiurus scindicus Henr. Gramineae. K 160, BM 1079. This erect perennial grass, woody-rhizomatous below, grows to about 1 m high. Its flowering spicate racemes are silky-hirsute and terminal, breaking at the joints, and 5–10 cm long; the rachis joints are densely hirsute. This grass is grazed by livestock.

ḏabyah (Banī Khālid). Cf. ***ḏabyah,*** “she gazelle,” but the meaning of the plant name is uncertain. A Bedouin of Āl Wahībah (of the southern Rub‘ al-Khālī and non–Najdī Arabic speaking) gave the synonym ***nazza‘.*** A member of the settled community of al-Ājām, near the Qaṭīf Oasis, called it ***alāl.***

Taverniera spartea DC. Leguminosae. BM 1467, 7459. This erect, silvery gray canescent shrub grows up to about 1.5 m high. The leaves are mono- or trifoliolate with obovate leaflets 5–8 mm long; the flowers are solitary or paired with corolla pink with red-mauve veins. It has pods 5–17 mm long, strongly compressed, and constricted into one to four rounded joints. The plant is apparently restricted to a few coastal locations and is probably not known among many inland tribes (figs. CD.319, CD.320).

dha'lūg (northern tribes; Musil 1928a, 693). It is also called ***dha'lūg al-jamal,*** "camel's ***dha'lūg***" (Musil 1927, 595), and ***mash'*** (Musil 1928a, 702).

Scorzonera tortuosissima Boiss. Compositae. BM 3114, 2888, 3871. This ascending, silvery grayish branched perennial is 20–50 cm high, with whitish canescent stems. The leaves are finely linear to subulate, 5–15 cm long below but much shorter above. The heads are numerous, solitary-terminal, and mostly with five to seven yellow florets. The narrowly columnar-prismatic achenes are 8–12 mm long, with a persistent pappus of brownish white bristles that are finely plumose below and scabrous above. The plant is reportedly sometimes eaten raw (Musil 1928a, 95).

gaṣbā (Āl Murrah). The root *q ṣ b* is the stem for the general Arabic name for reeds (large reeds of wetlands), *qaṣab,* but Āl Murrah and perhaps others apply the name ***gaṣbā*** quite specifically to two very similar species of the grass genus *Centropodia*, both nonreedlike and always found in deep sands or mobile dunes.

Centropodia forsskalii (Vahl) Cope. Gramineae. K, BM 234, BM 388, BM 1015. This ascending to decumbent perennial grass grows to 40 cm high. The inflorescence is a terminal panicle that is densely contracted and partly sheathed at base by the highest leaf (figs. CD.117, CD.118).

Centropodia fragilis (Guinet et Sauvage) Cope. 7541, 8035. This species is similar to the foregoing but has anthers twice as long (around 2 mm) and narrower than in *C. forsskalii*. Both plants, although never abundant, are grazed by camels (figs. CD.117, CD.118).

gharaẓ (Āl Murrah, Qaḥṭān), *Chrysopogon plumulosus* Hochst. Gramineae. BM 1051, 7942, 8321. A densely tufted, fine-culmed perennial grass, ***gharaẓ*** is usually 20–50 cm high with leaf blades up to

about 8 cm long. The ligule is a rim of fine hairs. The spikelets are in a terminal panicle 5–10 cm long with whorled branches; the pedicels of the lateral spikelets and the base of the sessile spikelet are densely bearded with golden tawny hairs.

girḏī, gurḏī (gen.), *Ochradenus baccatus* Del. Resedaceae. 2154, 7805, 8699. This glabrous, erect, branched dioecious shrub grows to about 1.5 m high and has narrowly linear deciduous leaves up to 4 cm long. The apetalous flowers are in spiciform terminal racemes, and the fruit is an ovoid to globose berry, 4–8 mm in diameter, and ripening to a waxy white (figs. CD.247, CD.248).

ḥazzā (Shammar). A Bedouin of the ʻUjmān tribe called this plant ***sūs,*** the general Arabic name for licorice.

Deverra triradiata Hochst. ex Boiss., subsp. *musilii* (Chrtek, Osbornova et Sourkova) Pfisterer et Podlech. Umbelliferae. BM 2955, 7399, 7904. This aromatic shrub with ascending, glabrous, virtually leafless wandlike stems grows up to about 1.7 m high. The three- to four-rayed umbels are at or near the branch tips, with the umbellules having mostly five to nine flowers. The fruits are about 2.5 mm long, ovoid, and densely whitish hirsute. Many herdsmen I met pointed out the camel's particular fondness for this plant, which is never very abundant and sometimes found standing within other shrubs in sand-floored, rocky ravines (fig. CD.142).

ḥazzaz (Muṭayr). The generic name ***ḥazzaz*** is related to ***ḥazzā;*** like the latter plant, the ***ḥazzaz*** is a strongly scented umbellifer.

Ducrosia anethifolia (DC.) Boiss. Umbelliferae. K 570, BM 3084. A perennial herb of strong, unpleasant odor, *Ducrosia* is 15–30 cm high, branching mostly from the base with glabrous stems and leaves. The leaves are ovate-oblong in outline, 2–6 cm long, and trisect with divided lobes. The umbels are long peduncled and with ten to fifteen rays, and the umbellules carry twelve to eighteen yellowish flowers. The fruits are ovate to elliptical and 7–8 mm long. This plant is infrequently seen and is usually found singly on silty soils of the northern plains and Ṣummān (fig. CD.151).

ʻijlah (Banī Khālid). In general Arabic, *ʻijlah* means "female calf, heifer," but I have no record of an explanation of this plant name.

Halopyrum mucronatum (L.) Stapf. Gramineae. K, BM 118, 1938, 7068. A coarse perennial grass with erect culms growing from a

woody rhizome, *Halopyrum* may attain a height of about 1.5 m. The leaf blades are narrowly linear and convolute, and the inflorescence is a narrow, contracted panicle 10–30 cm long. The distribution of this grass is restricted to dunes above the beach at a few coastal sites, and the species is known only by tribes that frequent coastal areas. It is considered good grazing for livestock, including horses.

karī (Āl Murrah), *Heliotropium digynum* (Forssk.) Aschers. ex C. Christ. Boraginaceae. BM 1438, BM 1469, 7632. This heliotrope is an ascending to erect, diffusely branched shrublet, softly pubescent, with white stems above, and 15–50 cm high. The leaves are ovate to oblong and up to 1.5 cm long; the flowers are yellow and sessile in terminal helicoid cymes. Āl Murrah consultants said that camels have a particular fondness for this plant (fig. CD.202).

khṣāb (ad-Dawāsir). A Qaḥṭānī informant gave the name ***saḥam*** for this grass. Musil recorded ***ṣullēyān*** from the Ruwalah in northern Arabia (1928b, 363).

Stipagrostis ciliata (Desf.) de Winter. Gramineae. K 161, BM 1736, BM 1752. A perennial grass growing to about 80 cm high, this *Stipagrostis* is the only one in the study area that has culms with spreading hair tufts at the nodes; the internodes are glabrous. The leaf blades are tightly involute and linear. The flowering panicle is erect, terminal, and sometimes contracted; the central awn of the spikelet is plumose and 45–50 mm long.

nuṣī (gen.). Tribes of the southern Rub‘ al-Khālī who speak a southern Arabic dialect use the synonym ***rāhim*** (Āl Rāshid). Various other names are applied to this important grazing grass to indicate different growth stages or conditions (see section 5.3.8).

Stipagrostis plumosa (L.) Munro ex T. Anders. Gramineae. K 175, K 8340, BM 1813. A perennial grass, ***nuṣī*** is densely tufted at the base with culms erect or geniculately ascending and grows to 15–45 cm high. The lower internodes are closely woolly below, and the leaf blades are tightly convolute, subfiliform-linear, and mostly 4–10 cm long. The flowering panicles are solitary-terminal, mostly 10–15 cm long and 0.5–2 cm wide. The spikelet's central awn branch is 20–25 mm long and plumose in its upper half to two-thirds. ***Nuṣī*** is a very important grazing plant throughout many parts of Arabia (fig. CD.313).

rkhēmā (Āl Murrah, Āl Rāshid). Variant names include ***rukhāmā*** (Qaḥṭān) and ***rukhkhāmā*** (Banī Khālid, Shammar, Ruwalah).

Convolvulus cephalopodus Boiss. Convolvulaceae. K 552, BM 1787, BM 3123. This *Convolvulus* is an ascending to decumbent shrublet, many branched from the base with stems more or less white woolly and villous, up to about 60 cm high. The leaves are linear-oblong to lanceolate, appressed-pubescent, and 2–7 cm long. Its flowers are clustered, with rather showy pink to near-white corollas 15–20 mm long (figs. CD.124, CD.125).

sabaṭ (gen.), *Stipagrostis drarii* (Täkh.) de Winter. Gramineae. K 475, BM 342, BM 606. A perennial grass usually with several erect culms, ***sabaṭ*** grows up to 120 (150) cm high and has densely woolly internodes. Its leaf blades are tightly involute and up to 25 cm long. Its flowering panicles are 10–30 cm long, terminal, lanceolate-pyramidal, and contracted when young, later becoming spreading and open. This well-known and important grazing species is found on semistabilized dunes in many parts of Arabia, including the Rubʿ al-Khālī (fig. CD.312).

slēlah (Ruwalah, per Musil, 1928b, 363).

Stipagrostis obtusa (Del.) Nees. Gramineae. 759, BM 1781. This perennial grass, usually less than 30 cm high, has glabrous internodes. The leaf blades are short, to about 8 cm long, and virtually filiform; the flowering panicles are less than 15 cm long, 1–4 cm wide. This species of *Stipagrostis* is usually found in very shallow sand over limestone or among rocks.

thēmūm (gen.). Variant: ***thmūm*** (Qaḥṭān). Both forms are based on the name ***thmām,*** itself applied only to the important fodder grass *Panicum turgidum,* which the plant listed here somewhat resembles when not in flower. A southern Arabic–speaking consultant of Āl Rāshid from the southern Rubʿ al-Khālī used the name ***ḥīlām*** for this *Pennisetum*.

Pennisetum divisum (Gmel.) Henr. Gramineae. K 2, K170, 1987. This grass is a glabrous, many-branched shrubby perennial, somewhat woody below, with stiff culms, forming bushes up to about 150 cm high. Its leaf blades are mostly 3–8 cm long and 1–2 mm wide. Its spicate panicles are dense to somewhat loose, cylindrical-lanceolate, and 3–10 cm long; the spikelets are about 4 mm long,

each seated in an involucre of bristles. It is a useful grazing plant but considered inferior to ***thmām,*** *Panicum turgidum*.

thmām (gen.). Variations on this name, ***thmūm, thēmūm,*** are applied to two somewhat similar bushy perennial grasses but never to this plant itself.

Panicum turgidum Forssk. Gramineae. K 171, BM 1077, BM 3140. This glabrous perennial grass has ascending, tangled culms branched upward at swollen, knotty nodes, forming rounded bushes to about 100 cm high. Its leaf blades are 6–8 cm long and 2–4 mm wide. It flowers are in open and rather irregular sparse panicles that are often 4–7 cm long with one to several racemes of pedicelled ovoid spikelets about 4 mm long. The anthers are rust colored and about 2 mm long. ***Thmām*** is a very important grazing plant, and it is dominant in a distinctive community type along and inland of the gulf coast. The grains are said to have been formerly collected for human consumption (figs. 1.8, CD.8).

thmūm (Banī Hājir). A variant of the name ***thmām*** (preceding entry), but the latter name is applied exclusively to *Panicum turgidum*, another and more important shrubby fodder grass. Synonyms recorded for this *Cenchrus* are ***khaḏir*** (Qaḥṭān, from root *kh ḏ r,* "to be green," referring to this grass's fresh green color compared to the color of more desert-adapted species) and ***gharaz*** (northern tribes; Musil 1928b, 357).

Cenchrus ciliaris L. Gramineae. K 28, BM 1234, BM 3136. ***Thmūm*** is another perennial grass, sometimes shrubby, with culms ascending from a stout, somewhat woody rhizome to about 100 cm high. The inflorescence is a terminal, cylindrical, spicate raceme 5–12 cm long, sometimes purplish, with spikelets crowded or sometimes somewhat loose. The spikelets have an involucre of bristles. A grass often associated with ground around the edges of towns and villages, *Cenchrus ciliaris* is seldom seen in undisturbed desert. It is the "buffelgrass" of the American West, where it is generally known under the synonym *Pennisetum ciliare* (L.) Link and is reviled as an invasive exotic. It provides useful fodder for the Bedouins but is not abundant enough to be of grazing importance (fig. CD.114).

zahr (gen. south). This generic name is of interest in being identical to the word used in many Arabic dialects to denote "flowers"

in general (sing. *zahrah*, "a flower"). Tribes in the southern and south-central parts of our study area apply it only as a name for two species of *Tribulus* (Zygophyllaceae), one of which has quite large, bright, showy flowers and indeed might be viewed as a local candidate for a prototypical "flower." Bedouins, at least those from the central parts of our study area, use a different term, ***nuwwār,*** for the flowers (in general) of plants.

Tribulus arabicus Hosni s.l. BM 194, BM 7446, 7857. This Arabian endemic is an ascending to decumbent grayish green perennial, pubescent with appressed and erect white hairs and 20–70(100) cm high. The leaves are 10–40 mm long in unequal pairs; the leaflets are in five to nine pairs, oblong-elliptical, and 4–8 mm long. The showy flowers are 15–30(40) mm across with bright yellow petals. The fruit is globose-ovoid, 9–12 mm long, and hairy between the wings; its carpels have subentire to dentate wings 1.5–2.5 mm broad. ***Zahr*** is one of the main camel grazing plants for tribes in the eastern and southeastern Rub' al-Khālī. Bedouins of Āl Rāshid have different names for the plant at different developmental stages (see section 5.3.8 and figs. CD.324, CD.325).

Tribulus pentandrus Forssk. agg. K 517, BM 653, BM 923. This prostrate perennial has stems up to 50 cm long; its leaves are pubescent, 15–35 mm long, with one of each pair smaller. The leaflets are in five to seven pairs, oblong, and 5–10 mm long. The flowers are solitary, 6–11 mm across, with pale yellow petals; the fruits are globular, hirsute between the wings, 8–11 mm in diameter, with dentate wings 2–4 mm wide between the carpels.

1. Life form: ***shajar***$_{1}$ (all perennials)
4. Sub–life form: ***shima'*** (bushes much shorter than man height)
   7. All non***hamḍ*** bushes
      9. Non***hamḍ*** bushes seldom browsed by or unimportant for livestock.

'aḍīd (gen.), *Launaea mucronata* (Forssk.) Muschl. Compositae. BM 871, BM 1445, BM 2258. This *Launaea* is an erect, branched, rather stout glaucous and lactiferous perennial herb growing 30–80 cm high. Its basal leaves are oblong-lanceolate, pinnatifid, and up to 15 cm long, and the stem leaves are shorter, with dentate

auricles at the base. The flowering heads are terminal, 1–1.5 cm long, with yellow florets (figs. CD.221, CD.222).

ʿaḏris (Qaḥṭān, gen.). Āl Murrah consultants used the variant ***ʿuḏris.***

Convolvulus oxyphyllus Boiss. subsp. *oxycladus* Rech. f. Convolvulaceae. BM 217, BM 3208, 8366. This bushy *Convolvulus* grows as a rounded shrublet, 15–65 cm high, with rigid, woolly-tomentose main branches; the lateral branches are straight and rigid, becoming spinescent at tips. The leaves are elliptical-oblanceolate to linear-spathulate, more or less woolly-tomentose, and up to about 4 cm long. The solitary flowers, 8 to 10 mm long, have white corollas that dry pinkish. The bush reportedly exudes a gum eaten by children (fig. CD.127).

ʿagrabān. The generic name ***ʿagrabān*** is based on *ʿ q r b*, a quadriliteral root closely associated with the word for "scorpion," ***ʿagrab;*** it is not entirely clear how this reed would be considered analogous, although the plumelike panicle, especially when nodding, vaguely resembles the scorpion's tail. The suffix ***-ān*** would connote "resembling" or "male gender of." This name for the common reed is replaced in the north with ***qaṣbā*** (Shammar, Ruwalah).

Phragmites australis (Cav.) Trin. ex Steud. Gramineae. K 117, BM 1899. This common reed is distributed worldwide. It is a stout, glabrous perennial 1–3 m high. The flowering panicle is plumelike, erect or nodding, and purplish to silvery whitish. It occurs in standing water around the edges of oases and sometimes even in deep desert in pools arising from leaking drilled water wells. Its stems are generally too weak to be useful for camel sticks or construction (fig. CD.258).

ʿāgūl (gen.), *Alhagi maurorum* Medik. Leguminosae. BM 1908, BM 2906. This erect to ascending shrublet grows up to 1 m high, is glabrous, and has lateral twigs that become spines up to 5 cm long. The leaves are obovate, to 2 cm long, and the flowers are pink to purple, in axillary racemes. The fruit is a linear-cylindrical pod 1–3 cm long, more or less curved and constricted between the seeds. *Alhagi* is known mainly as a plant of disturbed or waste ground. The roots are used medicinally, particularly for kidney ailments (fig. CD.54).

ʿalandā (gen.). Cf. classical *ʿalandá,* "thick, strong." A northern synonym, ***ʿadām,*** was recorded from a consultant of the Ruwalah tribe.

Ephedra alata Decne. Ephedraceae. BM 2836, BM 2853, 8728. This stiff, yellow-green, dioecious shrublet has striate twigs and grows to about 100 cm tall. The leaves are reduced to rudiments, and the plant appears virtually leafless. It bears sessile cones, the pistillate ones having several pairs of bracts (figs. CD.160, CD.161).

bardī (gen.), *Typha domingensis* Pers. Typhaceae. K 636. This stout, erect cattail usually grows 1.5–3 m high. Its leaves are linear, leathery, equaling or exceeding the stem, and 4–10 mm wide; they are flat above and rounded-convex below. The flowering spike is cylindrical and very dense, with its staminate and pistillate parts on the same axis. This cattail is overall rare in our area and is not a true desert plant but may be found in a few spots where there is standing water from leaking wells or springs.

b'ēthirān (Muṭayr, gen. northern), *Artemisia judaica* L. Compositae. BM 3207. A densely tomentose, aromatic shrublet, this wormwood grows 30–70 cm high. The leaves are rounded and mono- or bipinnatifid with oblong lobes. The inflorescence is terminal and paniculate, and the hemispherical heads are 3–4 mm across with numerous yellow florets. The plant is reportedly used in northern Arabia to flavor dates.

dhinabān (gen.). From ***dhanab,*** "tail," + ***-ān,*** "resembling," thus "tail-like," referring to the flowering of these plants in elongated, tail-like, terminal racemes. A Shammarī consultant used the variant ***dhanabnāb.*** Āl Murrah and Qaḥṭānī consultants gave the synonym ***shōlah,*** referring to a scorpion's tail and related to a term for a camel's upraised tail. The generic tends to be applied to several species of *Reseda* (Resedaceae), of which only one perennial is listed here.

Reseda muricata Presl. 2222, 8781. This ascending to erect perennial herb branches from the base and is up to 70 cm high. The leaves are linear, distally ternate, with linear lobes wavy at their margins. The flowers are ascending-spreading in terminal racemes, with white petals; the capsules are erect, subglobose, 5–8 mm long, with three teeth at the apex. The plant is uncommon but sometimes seen on disturbed ground.

garnuwah (Āl Murrah). The name is doubtless related to the word ***garn,*** "horn," referring to the pointed beaks on the plant's fruits. Āl

Murrah and Banī Khālid Bedouins also apply the name to several species of *Erodium*, which share the fruit beak feature.

Monsonia nivea (Decne.) Decne. ex Webb. Geraniaceae. 794, 1042, 8038. This ascending to erect silver gray canescent perennial grows to 8–30 cm high. The leaves are ovate to oblong-elliptical, 1.5–3 cm long, crenulate, and subplicate on the impressed nerves. The flowers are grouped two to six in umbels, with fugaceous pink petals slightly exceeding the sepals; the fruit beaks are 3.5–4 cm long (fig. CD.242).

gēṣūm (gen.), *Achillea fragrantissima* (Forssk.) Sch.-Bip. Compositae. 735, 3197, 8798. This closely woolly-tomentose perennial, branched from the base, grows 30–75(100) cm high with stems erect and virgate. Its leaves are ovate-triangular, sessile, bluntly serrulate at margins, and 4–6 mm long; the discoid heads are about 3–4 mm wide with yellow florets and are grouped in short, rather dense terminal corymbs. ***Gēṣūm*** is by far the most powerfully fragrant plant, in all of its parts, of our study area and is found on silt-floored basins of the northern plains and Ṣummān.

ghalgah (gen.), *Pergularia tomentosa* L. Asclepiadaceae. 352, 1053, 1875. A grayish tomentose shrub with milky sap, this milkweed relative has opposite leaves that are cordate, acute, and up to about 4 cm long. The flowers are in axillary umbels with whitish corollas about 10 mm across. The fruits are lanceolate-ovoid follicles, 4–5 cm long, and covered with spiny tubercles. This plant has been used to remove the hair from hides before tanning (fig. CD.255).

haltā (Āl Murrah). From ***halat,*** "to scratch (the skin)," thus "scratchweed." Synonyms include ***ḥamāh,*** "hotweed" (Qaḥṭān, ad-Dawāsir); ***jrēbah,*** "little mangeweed" (Ruwalah); and ***ḍabyah*** (Banī Khālid)—all but the last referring to the itching, burning sensation obtained when the plant is rubbed on tender skin. (With respect to "mangeweed," camels scratch themselves against objects continuously when afflicted with mange.)

Farsetia aegyptia Turra. Cruciferae. BM 1141, 2868. This ascending, many-branched shrublet grows to about 50 cm high with an indumentum of fine appressed hairs. The leaves are linear, 10–40 mm long, and 1–2 mm wide. The flowers have petals of variable color, ranging from lead gray or whitish to pink, yellowish,

or purplish. The fruit is a strongly compressed, oblong, silicle, 12–24 mm long, and 6–12 mm wide. Bedouin children use the plant in play as a sort of "itching powder" (figs. CD.177, CD.178).

The tribal elder of Qaḥṭān who gave the name ***ḥamāh*** for this plant applied it also to the next species, which has a more southerly distribution in our study area. A tribesman of Āl Rāshid (a speaker of southern Arabic) called this next plant ***ḥishām.***

Farsetia stylosa R. Br. BM 1128, BM 67, 8042. This gray-green, ascending, rather diffuse plant has closely appressed hairs. The leaves are linear and sessile, 10–35 mm long, and 1–3.5 mm wide. The flowers have petals 6–8 mm long and are white, sometimes tinged orange or yellow. The silicles are compressed, 12–25 mm long, and 2.5–4 mm wide.

ḥaṣal (Banī Hājir), *Cyperus laevigatus* L. Cyperaceae. BM 1887, BM 3799, BM 3801. This perennial sedge has numerous terete culms and is 30–100 cm high, arising from a creeping rhizome. The leaves are reduced and inconspicuous; the inflorescence is a dense, false-lateral, subglobular head 1–4 cm in diameter, with lanceolate-linear spikelets mostly 5–15 mm long. ***Ḥaṣal*** is not a desert plant and is usually found in or near standing fresh or brackish water in coastal zones. Tribes ranging near the coast, however, know and name it.

ḥatharah (Qaḥṭān), *Farsetia burtonae* Oliv. Cruciferae. K 572, BM 1271, BM 1597. This crucifer is an ascending low perennial herb, densely appressed-pubescent, and 3–25 cm high, sometimes flowering in dwarf form as little more than a seedling. The leaves are linear-elliptical to linear-oblanceolate and 10–40 mm long. The flowers are white or purplish pink with a very sweet, fruity fragrance; the fruit is a narrowly oblong compressed silicle 10–18 mm long (fig. CD.179).

'iḏat al-hāyish (Qaḥṭān). An elder Qaḥṭānī consultant explained the word ***hāyish*** as a variant of ***ḥanish,*** "snake." The meaning of the word ***'iḏah(t)*** is apparently figurative; the plant certainly does not belong to the class of spiny trees known by a similar name, and it is unarmed, but the suggestion of "spinyness" may refer to its noxious qualities. Violet Dickson gave the name ***ghaẓālah,*** "gazelle," for this plant (1955, 40).

Euphorbia retusa Forssk. Euphorbiaceae. BM 789, 2067, 8350. This erect, often reddish perennial herb with milky sap often grows as a dense, rounded shrublet to 60 cm high. The cauline leaves are linear, denticulate, and 1–5 cm long; the floral leaves are broadened and rounded at base, with acuminate tips. The fruits are capsules 5–6 mm long. *Euphorbia retusa* is an infrequent plant of silty basins said to be used medicinally as an emetic (figs. CD.172, CD.173).

idhn al-ḥimār (north; Musil 1927, 606). From ***idhn,*** "ear," + ***al-ḥimār,*** "the donkey," thus "donkey's ear," probably referring to the plant's softly hairy leaves (or conceivably to the form of the flowers' erect corollas).

Astragalus kahiricus DC. Leguminosae. BM 537. This procumbent or decumbent perennial branches from the base and has pubescent stems 15–50 cm long. The pinnate leaves are 10–25 cm long, with five to nine pairs of leaflets that are orbicular with apiculate apex, 10–25 mm across, and woolly-tomentose below. The flowers are yellow, about 25 mm long, and in racemes. The white-lanate calyx encloses the pod and is 10–15 mm broad (fig. CD.82).

ʻishrig (gen.). A Qaḥṭānī consultant used the synonym ***shajarat ad-dābb,*** from ***shajarah,*** "bush," + ***ad-dābb,*** "the snake," thus "bush of the snake" or "snake bush."

Cassia italica (Mill.) F. W. Andr. Leguminosae. BM 2947, 1049. This legume is an erect to ascending-spreading branched shrublet with blue-green foliage; it grows up to about 100 cm high. The paripinnate leaves have three to six pairs of oblong to obovate mucronate leaflets 1.5–3 cm long. The racemed flowers are yellow with darker veins and 1–1.7 cm long. The pod is flat, curved-oblong, 3–5 cm long, and 1–1.8 cm wide with transverse creases and short longitudinal crests. The plant is considered toxic to livestock and is sometimes used medicinally as a purgative (figs. CD.111, CD.112).

jaʻdah (gen.). I have no record of a meaning for this generic from informants, but it can be compared to the classical word *jaʻd,* "curled (hair), woolly," which fits the plant well. (The adjective, however, might be based on the plant.)

Teucrium polium L. Labiatae. 184, 447, 8272. This dwarf shrublet is highly aromatic, whitish woolly-canescent, and 10–35 cm high.

The leaves are oblong, crenulate and revolute, and 8–20 mm long. The flowers are in dense ovoid heads 12–15 mm wide; the calyx is tomentose-woolly; and the corolla is white or cream to pale pinkish, yellowish in the throat, and has one prominent lip. ***Ja'dah*** is a very well-known medicinal; it also has insect-repellent properties and is used to preserve stored leather. According to a Banī Hājir consultant, it is one of the favorite food plants of the game bird, the ***ḥbārā*** (the houbara bustard, *Chlamydotis undulata*) (figs. CD.321, CD.322).

jathjāth (gen.). I heard the variant ***jathyāth*** from some consultants of northern tribes. A Marrī tribesman called it ***'rēfijān,*** which is from ***'rēfij,*** the diminutive form of the name of the ***'arfaj*** bush *(Rhanterium epapposum),* which it resembles, + suffix ***-ān,*** "resembling," thus literally "little ***'arfaj***-like bush."

Pulicaria undulata (L.) C. A. Meyer. Compositae. 315, 1974, 8295. This ascending, often hemispherical suffrutescent perennial grows to about 75 cm high. It is intricately branched from the base with stems white woolly-tomentose, and the leaves are linear or broadening distally, repand-undulate, and mostly 5–20 mm long. The flowers are in solitary-terminal, hemispherical heads, the disc convex with golden yellow to orangish florets. The plant is found in silt-floored basins, sometimes as a ruderal. Several consultants pointed out that it was "not good for grazing" (figs. CD.269, CD.270).

khaṭmī (north; V. Dickson 1955, 33). I have recorded this name also for the oasis weed *Convolvulus arvensis* L., and it may be found applied to other species of *Convolvulus*.

Convolvulus pilosellifolius Desr. in Lam. Convolvulaceae. BM 609, BM 1096, BM 3086. This *Convolvulus* is a prostrate or ascending perennial, more or less appressed-pubescent, with stems to about 80 cm long. The lower leaves are oblong-lanceolate, to about 8 cm long; those above are smaller and lanceolate. The flowers are mostly clustered one to three together, with corollas 10–13 mm long, and are pink or sometimes near white; the fruit is a glabrous, ovoid capsule about 5 mm long (fig. CD.126).

khinnēẓ (Qaḥṭān). From the root *kh n z,* "to stink," thus apparently "stinkweed." Synonyms include: ***ḍurrēṭ an-na'ām*** (Musil 1927,

631), the diminutive intensive of ***ḍarṭ,*** "fart," + ***an-na'ām,*** "the ostrich," thus "ostrich fart"; and ***'ifēnah*** (Musil 1927, 597), from the root *' f n*, "to be putrid, stinking," a diminutive feminine, thus "stenchweed." All names refer to the rather distinctive unpleasant smell of this plant's foliage.

Cleome amblyocarpa Barr. et Murb. Capparaceae. BM 611, BM 3117, BM 7494. This erect perennial fetid herb grows to about 45 cm high, sometimes suffrutescent at base. The leaves are trifoliolate with elliptical-lanceolate leaflets 4–25 mm long; the petals of the flowers are white and broadly veined yellow with purple-veined tips. The fruit is a compressed, glandular, two-valved capsule 10–50 mm long (fig. CD.123).

khiyyēs (aṣ-Ṣulabah). An intensive diminutive form closely related to the word ***khāyis,*** "stinking," thus "stinkweed." Musil recorded from the Ruwalah the synonym ***shajarat al-khinēẓīr,*** from ***shajarah,*** "bush," + the diminutive of ***al-khinẓīr*** (1927, 621). Musil (as usual) did not provide a gloss for the name. The word *khinzīr* in general Arabic is often glossed "pig, swine," but there is evidence of its use in a wider sense in at least one Bedouin Arabic folk classification of animals. It can be an inclusive term for a variety of mammals that are generally considered inedible. In addition to the pig, it includes apes, the donkey, and all carnivores (Hobbs 1989, 87). *Peganum* in other parts of Arabia and in other Arab countries is usually called *ḥarmal,* but that is the name applied to the apocynaceous shrub *Rhazya stricta* in our area. The name *ḥarmal* was carried into scientific taxonomy by Linnaeus as the specific epithet.

Peganum harmala L. Zygophyllaceae. *Peganum* is a glabrous perennial herb to about 50 cm high. Its leaves are sessile and irregularly pinnatifid into linear-lanceolate lobes; the petals of the flowers are white, sometimes streaked yellowish or green. The fruit is depressed globose and 6–10 mm in diameter. The plant is quite rare in our area.

kidād (gen.). Cf. classical *kadda,* "to comb the hair"; the long spines of this plant resemble the teeth of a comb. A Qaḥṭānī offered the variant ***kdēyidān,*** the diminutive of the name + the suffix ***-ān.*** A consultant of the Ḥarb tribe from northwestern Arabia gave the name ***shawīṭ,*** related to ***shawwaṭ,*** "to burn the spines off plants,"

referring to the practice of burning off the spines of this plant so that it can be eaten by camels in times of drought.

Astragalus spinosus (Forssk.) Muschl. Leguminosae. 381, 753, 2203. This ascending, branched, exceedingly spiny shrublet is usually 20–70 cm high. The young leaves have four to five pairs of oblong-elliptical leaflets 4–7 mm long, but the rachises soon drop the leaflets and become rigid, sharp spines. The flowers are mostly solitary, axillary, and about 20 mm long; the corolla is whitish tinged with pink, and the conspicuous inflated calyx is 15–18 mm long, pinkish to cream white, enclosing the pod. Bedouins describe this plant as being too spiny for the camel to eat unless the spines are burned off. It is a range increaser often marking severely overgrazed land (figs. CD.87, CD.88).

kirsh (Banī Hājir). From the word ***kirsh,*** "paunch, rumen (of livestock)," probably in reference to the plant's reputation for causing bloat in camels and other ruminants. A consultant of the Ruwalah, northern Arabia, gave the synonym ***dabghah,*** from ***dabagh,*** "to tan a hide, make leather." I have no data indicating its present use for tanning, but the probable former use of at least one species of *Erodium* as a tanning agent is indicated by Musil's record of the name ***dahma*** for *Erodium laciniatum* (Cav.) Willd (1927, 596). Ibn Khālawayh's plant book of the tenth century A.D. noted that *dahmā'* was used for tanning (Nagelberg 1909, xviii).

Erodium glaucophyllum (L.) Ait. Geraniaceae. BM 1595, BM 1782, 8619. This stout perennial, glaucous herb grows to about 75 cm high. The leaves are ovate or subcordate to oblong, opposite at least above, and about 4 cm long. The flowers are grouped two to four in umbels, with fugaceous, bright purple petals; the beaks of the fruits are 6–7 cm long (figs. CD.168, CD.169).

mḥarūt (Shammar, gen. northern). I sometimes heard ***ā*** in this name, as in ***mḥārūt.*** This plant is not found in the strict confines of our study area but is present in northwestern Saudi Arabia, where it has been well known for its edible rootstock. Musil identified it as *Scorodosma arabica* Vel (1927, 612). That genus is now sunk in *Ferula,* and Musil's plant is probably one of the two following species.

Ferula blanchei Boiss. or *F. rutbaensis* C. C. Townsend (Umbelliferae). Both are perennial plants to about 50 cm high with thickened

root. Both also have gray, velvety-canescent leaf surfaces, meeting Musil's description of the plant as having leaves "looking as if they were covered with a white veil" (1927, 270–71). The thick root of the plant is edible, consumed after baking under hot ashes. There may be more than one species of *Ferula* with the same vernacular name and used in the same way.

mṣa' (gen. north). Bedouins of northern Arabia who gather the plant's edible fruits favor this name for *Nitraria.* In the stricter confines of our study area, at least tribes in the gulf coastal zone call it ***ghardag*** (V. Dickson 1955, 67), a variant of the *gharqad* of classical Arabic sources. A Sharārī consultant (from the far northwest) said that ***ghardag*** was used by his people as a catch-all term for the very succulent species of ***ḥamḏ̣*** (Chenopodiaceae) found in salt marshes, thus equivalent to the ***ṭahāmīj*** of Banī Hājir along the gulf coast in our study area.

Nitraria retusa (Forssk.) Aschers. Zygophyllaceae. 7977. This ascending, stiff-branched shrub is 1–2 m high with gray woody twigs that become spinescent. The leaves are obovate-deltoid, obtuse, truncate or faintly retuse, and 8–15(20) mm long. The flowers are 5–6 mm long with hooded, greenish white to yellowish petals; the fruit is an ovoid red drupe 5–9 mm long. The fruits are edible and used to be often collected in northwestern Arabia. In our area, the shrub occurs only on the northern coast, near the Kuwait border (figs. CD.245, CD.246).

namaṣ (gen.). A Banī Khālid consultant used the synonym ***wasal.***

Juncus rigidus Desf. Juncaceae. K 123, BM 1886, BM 3800. This stout, tufted perennial is the common rush of the oasis wetlands in the study area. It grows from creeping rhizome and has numerous rigid, erect stems up to about 1.5 m high. The leaves, which arise from the base, are terete, sharp pointed, 2–3 mm in diameter, and mostly somewhat shorter than the flowering stems. The inflorescence is a false-lateral, contracted, or loose panicle of numerous flowers, up to about 25 cm long. The fruit, 3–4 mm long, is a lanceolate-ovoid capsule that tapers to an acute apex. The plant is often used in the oases as a material for weaving mats.

nigd (gen.), *Anvillea garcinii* (Burm. f.) DC. Compositae. BM 1505. *Anvillea* is a woolly-canescent, rigidly branched perennial that is

rounded, often broader than tall, and about 20–50 cm high. The leaves are oblong to spathulate, long tapering to the base, repand, and with margins that may be entire, irregularly dentate, or lobed. The heads are discoid, 2–3 cm across on thick peduncles, with golden yellow florets. The plant is frequent on silty basins (figs. CD.70, CD.71).

rā (gen.). A Banī Hājir consultant used the synonym ***tuwwēm,*** "pearly bush," from ***tuwam,*** "pearls"—the fleecy parts of this plant having a pearly luster.

Aerva javanica (Burm. f.) Spreng. Amaranthaceae. BM 173, 648. This gray shrublet, tomentose with dense stellate hairs, grows 30–70 cm high with erect stems branching from the base. The leaves are elliptical-oblanceolate and 1–5 cm long. The flowers are densely white fleecy and in mostly terminal spikes to 5 cm long. The fleecy parts were used in earlier times for the stuffing of cushions and saddle pads.

ragrūg (gen.). This generic applies to several species of *Helianthemum* (Cistaceae), all important as indicators of favorable locations for desert truffles, ***fag'***. My impression is that the focus of the name may be on the two perennial species of this genus, *H. lippi* and *H. kahiricum*. For the annual species, see the name ***jirrēd,*** under life form ***'ishb.*** The following are common synonyms: ***umm as-swēgah*** (Āl Murrah), ***swēgah*** (Ruwalah, Musil 1927, 625), ***jirrēd*** (Ẓafīr), ***argā*** (Banī Hājir; also Ruwalah, Musil 1927, 598), and ***hashmah*** for *H. kahiricum* (from a northern informant of uncertain tribe, perhaps Ṣulabah), a name noted also by Violet Dickson (as cited in Burtt and Lewis 1949, 304).

Helianthemum kahiricum Del. BM 1222, 8600. This dwarf shrublet, gray green with stellate pubescence, grows to 10–30 cm high. The leaves are elliptical-lanceolate, revolute-margined, and 3–12 mm long. The flowers are racemed, pedicillate, rarely seen open, and have yellow petals; the fruit is an ovoid capsule about 4 mm long with spreading hairs above (fig. CD.199).

Helianthemum lippii (L.) Dum.-Cours. BM 1212, BM 3071, BM 3143. This second perennial *Helianthemum* is an ascending, stellate-pubescent dwarf shrublet with branches often white glossy beneath the hairs. The leaves are elliptical-lanceolate, revolute-margined,

and 4–17 mm long. The flowers are sessile or subsessile in five- to ten-flowered, often one-sided spikes; the capsule is ovoid and hairy. This plant is clearly differentiated from *H. kahiricum* by its sessile or near-sessile flowers (figs. CD.200, CD.201).

ramrām (gen.). This generic is applied to either of two very similar species of *Heliotropium* (Boraginaceae).

Heliotropium bacciferum Forssk. BM 1054, 8277. This ascending, dark green or grayish green, hard-herbaceous perennial is 15–75(100) cm high, with a rough surface of appressed hairs and larger bristles. The leaves are narrowly elliptical, oblanceolate to linear, and 0.3–4 cm long; the flowers are in terminal helicoid cymes with white corollas. The fruits, which are globose or depressed globose, separate into two parts (each of two fused nutlets). The plant is a traditional medicinal used to treat snakebite.

Heliotropium ramosissimum (Lehm.) DC. BM 1693, BM 3110, BM 7509. Closely related to the previous *Heliotropium,* this shrublet is also intricately branched, densely hairy to bristly, and 15–50 cm high. Its leaves are narrowly elliptical or oblanceolate to linear and 0.5–3.5 cm long. The white flowers are in terminal helicoid cymes, and the maturing fruits are more or less globose, but each separates into four pubescent nutlets. Like *H. bacciferum,* this species is a medicinal used traditionally for snakebite (figs. CD.203, CD.204).

rashād (gen.). The synonym ***hōr*** was heard from a Bedouin of Banī Khālid (a name given on several occasions by northern consultants in loose application to any plants of salt marsh habitat).

Sporobolus iocladus (Nees ex Trin.) Nees. Gramineae. K 165, BM 3730. This perennial grass is usually of saline habitat; it is densely tufted at the base and often spreads by stolons, with erect culms to about 75 cm high. The leaf blades are stiff, narrowly linear, and tightly involute, to about 20 cm long. It flowers in terminal panicles that are open when mature, with spreading capillary branches and to about 20 cm long. This grass is considered poor forage.

The same name is applied also to the weedy crucifer *Lepidium sativum* L., sometimes found around farms and gardens.

sakhbar (ʻUtaybah, ad-Dawāsir). The synonym ***idhkhir*** (ad-Dawāsir) is common and seems to be preferred when the plant is referred to

as a medicinal. Also recorded were the synonyms ***khṣāb*** (Qaḥṭān) and ***ḥamrā*** (Ruwalah).

Cymbopogon commutatus (Steud.) Stapf. Gramineae. BM 2240, BM 2838, BM 3120. This perennial grass is strongly sweet aromatic in vegetative parts and grows densely tufted at the base with erect culms to 100 cm high. Its leaf blades are linear, subfiliform, and somewhat curled; its flowering panicle is terminal, erect, more or less spathulate at the base, with distant pairs of diverging racemes. The spikelets bear kneed awns. This grass is used medicinally, and its sweet odor is characteristic of the genus *Cymbopogon*. Various species of the genus have long been used in Asia as the source of citronella oil and the spice lemon grass (figs. CD.134, CD.135).

shafallaḥ (gen.), *Capparis spinosa* L. Capparaceae. BM 3122, 8377. This caper is a scrambling, branched shrub growing to about 0.6 m high and 2–3 m or more broad. The leaves are mostly alternate, orbicular, or broadly ovate, more or less tomentose when young, and 1–4 cm wide. The stipules are modified to sharp, hooked spines 3–5 mm long. The flowers are showy, to about 8 cm across, with white to pale pink petals. The fruits are obovate-ellipsoid, about 3 cm long and dark green with seven lighter longitudinal stripes; the fruits open by valves to expose the red pulp and numerous seeds. ***Shafallaḥ*** is a well-known but uncommon plant in our area (figs. CD.107, CD.108).

shajarat an-na'ām (Qaḥṭān). From ***shajarah,*** "bush," + ***an-na'ām,*** "the ostrich," thus "bush of the ostrich" or "ostrich bush." This plant was said to have been eaten by ostriches before ostriches became extinct in Arabia in the late 1930s.

Psoralea plicata Del. Leguminosae. BM 7013, 477. This shrublet is ascending, gray-green, appressed-pubescent, with scattered white to yellowish glands, and it grows to about 50 cm high. Its leaves are trifoliolate with narrowly oblong leaflets, plicate on the nerves and undulate margined, and 4–10 mm long. The flowers are in open spicate racemes and are 3–5 mm long with white standard and violet-tinged wings and keel. The pod is ovoid, enclosed in the calyx, and 3.5–4 mm long. This plant is rare in our study area.

shēyyūkh (Āl Murrah). The variant ***shuwwaykh*** (Banī Hājir, Ruwalah) is also commonly heard. A Shammarī informant gave the name

kharshaf for the same plants, which are two somewhat similar species of globe thistle, *Echinops* (Compositae). Another synonym from a northern informant (tribe uncertain but perhaps Ṣulabah) was ***ka‘‘ūb*** (for *E. blancheanus*).

Echinops blancheanus Boiss. K 585, 8801. This thistle is an erect spiny perennial growing to about 150 cm high. The lower leaves are lanceolate in outline, half-clasping at the base, up to about 40 cm long, and pinnatisect in triangular lobes terminating in spines. The globular heads are up to about 8 cm in diameter (not including the spines) and are strongly cornigerous. The corollas are pale violet when young, later becoming whitish to cream. The plant is found in silty or rocky ground in the northern parts of our study area (figs. CD.152, CD.153).

Echinops mandavillei Kit Tan. K 446, E 7760, BM 1811. This felty-tomentose spiny perennial grows 20–60 cm high; the stem leaves are lanceolate, mostly 8–17 cm long, amplexicaul at the base, and with lobes terminating in spines. The heads are solitary, globose, 5–6 cm in diameter, with whitish to pale bluish florets. This plant is a thistle of sand terrain (figs. CD.154–56).

shīḥ (gen.), *Artemisia sieberi* Besser. Compositae. 1582, 2862. This ascending, grayish tomentose shrublet is strongly aromatic with a lemony sweet fragrance and grows to about 50 cm high. The lower leaves are ovate to oblong in outline, mono- or bipinnatisect into fine obtuse lobes mostly 1–4 mm long. The heads are nearly cylindrical, sessile in a rich, dense paniculate inflorescence, and about 3–4 mm long. The plant is a well-known medicinal that was also once used to provide tinder for making fire with flint and steel (fig. CD.74).

shubrum (gen.). Synonyms include: ***shibrig*** (Sharārāt), comparable to classical *shabraqa,* “to cut, tear to pieces,” in probable reference to this plant’s spiny nature; and ***sillā*** (Ḥarb, ‘Utaybah, Muṭayr, Hutaym), doubtless the source of the scientific genus name.

Zilla spinosa Prantl. Cruciferae. 695, 2270. *Zilla* is an intricate, rounded, glabrous, often nearly leafless, spiny-branched shrublet growing to about 75 cm high. The leaves on fresh growth are oblong-linear and fleshy, but older growth is nearly leafless, with stems hardening to tapering spines. The flowers are pink or violet

or sometimes nearly white, with darker veins. The fruit is ovoid-globose, becoming bony-hard, 8–10 mm in diameter, with a 3–4 mm beak at the apex (figs. CD.328, CD.329).

tannūm (gen.), *Chrozophora oblongifolia* (Del.) A. Juss. ex Spreng. Euphorbiaceae. BM 509, 3204, 7806. This perennial is shrubby but hardly woody, stellate-canescent, gray-white ascending, and 40–100 cm high. The leaves are mostly elliptical-lanceolate to broadly ovate-triangular, with repand margins and 2–6 cm long. The flowers are racemose, 3–5 mm long; the capsules are depressed-globular with three rounded lobes, silvery scurfy, and 5–7 mm long. The plant was formerly used in making ink and possibly in dyeing (fig. CD.119).

tummēr (Shammar). The root *t m r* is closely associated with the fruit of the date palm, called *tamr,* "ripe dates," but any association here is unclear. The same name, according to Musil (1928a, 710), is used in northern Arabia for two species of annual *Erodium* (see the ***tummēr*** entry under life form ***'ishb.***

Onobrychis ptolemaica (Del.) DC. Leguminosae. BM 708, BM 1623, 8620. This perennial is densely covered with fine, white, erect hairs and is branched from the base, with stems 15–30 cm long. The leaves are imparipinnate, 10–15 cm long, with four to six rather distant pairs of lanceolate to elliptical leaflets 12–20 mm long. The flowers are 10–15 mm long and cream with reddish veins; the pods are flat-orbicular, 8–13 mm in diameter, densely silky-pubescent with short prickles (figs. CD.249, CD.250).

umm gṭēnah (Muṭayr). From ***umm,*** "mother," + ***gṭēnah,*** feminine diminutive of ***gaṭn,*** "cotton," thus "mother of little cotton," "cotton-bush." Muṭayr consultants also used the synonym ***sh/hēbā,*** diminutive of ***shahbā,*** "gray" (fem.), "little graybush," Both names refer to this plant's dense, gray pubescence.

Sophora gibbosa (DC.) Yakovl. Leguminosae. 8824, 8830. This *Sophora* is an erect shrublet, strongly woody at base and 30–80 cm high; it is silvery gray canescent with dense, silky-appressed hairs. The leaves are imparipinnate, up to about 15 cm long, and have six to nine pairs of obovate to suborbicular leaflets 5–15 mm long. The flowers, in terminal racemes, have pale yellow corollas of which the standard darkens with age. The strongly compressed pod is

appressed-silky, linear, contorted or coiled, and up to 6 cm long. So far this plant has been found only on the extreme northwestern edge of our core area (figs. CD.308, CD.309).

'uwēdhirān (Muṭayr). This name is formed from the diminutive of ***'ādhir,*** the well-known name of *Artemisia monosperma,* + the suffix ***-ān,*** conveying the idea of resemblance, thus "little ***'ādhir***-like bush." This plant does resemble ***'ādhir*** but is a less-useful, weedy species often seen along roadsides and on other disturbed ground in northern parts of the study area.

Artemisia scoparia Waldst. et Kit. Compositae. 575, 3203. This erect annual or biennial, nearly glabrous, often grows to 50–100 cm high, with sometimes reddish stems. The basal leaves are ovate in outline and bipinnatisect into linear-oblanceolate lobes; the stem leaves are sessile with subfiliform lobes. The numerous obovoid heads are 1.5–3 mm long and are grouped in one-sided racemes, all forming an elongate, terminal, paniculate inflorescense up to about 40 cm long. This atypically long-lasting annual is placed among perennials here because it is thought of as a "bush," like its namesake ***'ādhir,*** rather than as an annual herb.

yanbūt (gen.), *Prosopis farcta* (Banks et Sol.) Macbride. Leguminosae. 507, BM 1098. This straggling shrub, 0.4–2 m high, is finely pubescent on its leaves and young stems; the older branches are grayish to white, with scattered prickles. The leaves are bipinnate with three to six pinnae pairs; the leaflets are in eight to fourteen pairs, oblong-elliptical, 2–3.5 mm long. The flowers are cream, 3–4 mm long, and in spikes 4–10 cm long. The fat pod is ovoid or irregularly swollen, to about 5 cm long, and purplish brown when ripe. This plant is a weed shrub of wasteland and disturbed ground around cultivation, but it was collected one time in a disturbed inland desert basin.

1. Life form: ***shajar***$_{1}$ (perennial plants, often woody)

10. Residual group of perennials smaller than bush size

The following perennials are generally considered to be not high or prominent enough to be classed as ***shima',*** "bushes." They are treated simply as ***shajar*** (in the ***shajar***$_{1}$ sense, "perennials"). In the alternative, northern (provisional) classification described in section 5.3, they would be candidates for classification as ***at-ṭawālī'.***

drēmā (Āl Murrah, Banī Hājir). I heard the nondiminutive form of this name, ***darmā,*** for this plant from a Rāshidī of the southern Rub‘ al-Khālī. The synonym ***ḥlēwā,*** “little sweet one,” referring to the sweet fragrance of the plant’s flowers, is also well known among Āl Murrah and Banī Hājir and is used almost as often as ***drēmā.*** Bedouins in northern Arabia use the synonym ***janbah,*** sometimes heard as ***jambah*** (Ruwalah). All synonyms are applied to several species of *Fagonia* (Zygophyllaceae), the focus being probably *F. bruguieri*.

Fagonia bruguieri DC. BM 1689, BM 3113, 8639. This procumbent, minutely glandular subshrub with sulcate stems spreads from a woody base and has stipular spines to 12 mm long. The leaves are mono- to trifoliolate with the central leaflet larger, lanceolate to ovate, and 4–10 mm long. The flowers are solitary, very fragrant, and with pale pink to purple petals; the capsule is pyramidal, with five angles, and 3–5 mm long (fig. CD.174).

Fagonia indica Burm. f. BM 3791, BM 3821, 8425. This plant is similar to the previous one, but its leaves are monofoliolate, and the single leaflet is 2–3.5 mm wide. It is apparently found only in the more southerly parts of our study area.

Fagonia ovalifolia Hadidi. BM 1081, 8136. This species is close to *F. indica* but has larger leaflets 4–8(13) mm wide. It is also of southern distribution.

Fagonia olivieri DC. BM 1075, K 520. This plant is rather similar to *F. bruguieri* but quite glabrous (nonglandular) and with the middle and upper internodes distinctly sulcate-quadrangular. Some tribesmen might apply the name ***drēmā*** also to *Fagonia parviflora* (see the entry ***umm at-trāb*** later) (fig. CD.176).

haddārat al-jamal (north, informant’s tribe unidentified, perhaps Ṣulabah). From ***haddārah*** (meaning is uncertain) + ***al-jamal,*** “the male camel.” The word ***haddārah*** is an intensive noun form possibly related to the root *h d r,* “to grumble,” thus perhaps “that which makes the camel grumble.”

Salvia spinosa L. Labiatae. BM 560, BM 623, BM 807-A. This stout perennial herb is usually found on silty ground of northern basins. It grows up to about 40 cm high and has petiolate basal leaves that are ovate and bullate, up to about 25 cm long or sometimes larger. The flowers, with white corollas 20–25 mm long, are in a

dense, pyramidal inflorescence. The calyces are 15–20 mm long in flower but grow somewhat longer in fruit (fig. CD.293).

ḥalam (gen. south), ***ḥamāṭ*** (gen. north). *Moltkiopsis ciliata* (Forssk.) I. M. Johnston. Boraginaceae. BM 1439, 7683. This rough-leaved shrublet, 10–30 cm high, has flowers often multi-colored in the same inflorescence: red, bluish, and white (fig. CD.240).

'ikrish (gen.), *Aeluropus lagopoides* (L.) Trin. ex Thwaites. Gramineae. K 3, 3803, 8291. This pubescent perennial grass has spreading, wiry stolons or rhizomes and shoots ascending from the rooting nodes. The culms are up to about 15 cm high, and the leaves are distichous and channeled or infolded longitudinally, with finely hairy blades and sheaths. The inflorescence is a very dense subglobose or oblong terminal head of hairy spikelets, 5–15 mm long. This plant is an obligate halophyte of *sabkhah* (salt flat) edges. It is grazed, although it is poor fodder (fig. CD.51).

'itr (Banī Hājir, Āl Rāshid). I recorded multiple synonyms for this widely known edible plant: ***kurrēsh*** (Āl Murrah), a diminutive intensive form from ***kirsh,*** "paunch, rumen" (of livestock), in this case referring to the inflated fruits' paunchlike shape; ***kabūsh*** (Yemenī tribesmen, cf. the fruit name); ***kubbēsh*** (Qaḥṭān, also similar to the fruit name); ***'antēr*** (Ṣulabah and Hutaym of northern Arabia); ***ṣakab*** (Shammar). The edible fruits are called ***jarū*** (Banī Hājir, the same term applied to young dogs, pups); ***'itrī*** (Qaḥṭān, ***'itr*** + suffix ***-ī,*** forming the *nisbah* relative adjective from the plant name); ***kabash*** (Āl Rāshid, of southern Arabic speech, cf. similar names for the plant).

Glossonema varians (Stocks) J. D. Hooker. Asclepiadaceae. BM 1823, 7841. This ascending, branched, perennial lactiferous herb is gray green and pubescent with short white hairs, growing to about 25 cm high. The leaves are 1–2 cm long and broad. The yellowish brown flowers are mostly grouped about five together, and the fruit is an inflated, ellipsoid follicle 3–5(6) cm long, smooth glaucous with soft conical tubercles. Both the young fruits and leaves of this plant are edible raw (fig. CD.184).

jrēbā (Shammar). The name is the diminutive of ***jarbā,*** meaning "afflicted with mange" (fem. singular adj.), thus "little mangy one." The puckered, bullate surfaces of the leaves resemble the hairless, bumpy skin of a camel infected with sarcoptic mange.

Salvia lanigera Poir. Labiatae. BM 810, BM 1334, BM 1616. This dwarf shrublet is 10–20 (30) cm high and tomentose with a short pubescence. The leaves are in distant pairs, elliptical to linear-oblanceolate, weakly rugose-bullate, and 10–20 mm long. The flowers are white to pale bluish, densely spotted blue-violet, with the lower lip longer than the upper (fig. CD.292).

kalbah (Qaḥṭān). From ***kalbah,*** "female dog, bitch," thus "bitch bush." Another Qaḥṭānī gave the synonym ***jalwah.*** A member of Banī Hājir offered the name ***shuwwaykh,*** which is applied also to several other thistles.

Atractylis carduus (Forssk.) C. Christ. Compositae. BM 1619, BM 1734, BM 8076. This perennial thistle, growing to about 30 cm high, is usually (but not always) gray cobwebby-tomentose overall. The leaves are linear-lanceolate, 2–6 cm long, with pinnate spinescent lobes. The heads are solitary and terminal with yellow florets and spreading outer bracts resembling the stem leaves (fig. CD.90).

labnah (Āl Murrah). This generic is from ***laban,*** "milk, sour milk," in reference to the plant's milky sap. A consultant of the ʻUjmān tribe used the synonym ***ḥillab,*** an intensive form related to the word ***ḥalīb,*** "milk, fresh milk."

Euphorbia granulata Forssk. Euphorbiaceae. BM 1130, BM 2247, BM 3130. This prostrate, sparsely to densely pubescent annual or perennial is grayish green or reddish and spreads from the base with many branching stems to 20 cm or more long. The leaves are opposite, mostly oblong, and 3–7 mm long. The flowers' glands are minute, whitish, petaloid appendages. The same names may be found applied to other, less common, species of herbaceous *Euphorbia*s in our study area.

makar (Āl Murrah). A consultant of Āl Rāshid (a non–Najdī Arabic speaker) gave ***laʻlaʻah*** as a name for this plant, and a Shammarī from northern Arabia offered ***rgēyigah,*** a diminutive feminine noun form from ***ragīg,*** "thin, fine (in shape)," a reference to the plant's thin-stemmed, straggly appearance.

Polycarpaea repens (Forssk.) Aschers. et Schweinf. Caryophyllaceae. BM 5, BM 1440, BM 3156. This usually prostrate, straggly perennial of sandy terrain is closely woolly-tomentose to

glabrescent with stems a bit woody at the base. The prostrate stems may exceed 25 cm in length; they bear opposite lanceolate-linear leaves that are 3–10 mm long. The plant has scarious stipules, and the flowers are mostly near ends of the stems and 2–2.5 mm long, with scarious-margined sepals. This very common plant of sand terrain is used to treat camels' sarcoptic mange (figs. CD.265, CD.266).

mishṭ adh-dhīb (Qaḥṭān). From ***mishṭ,*** "comb," + ***adh-dhīb,*** "the wolf," thus "wolf's comb."

Astragalus sieberi DC. Leguminosae. BM 2239, BM 2973, BM 3097. This cushionlike pubescent perennial is usually 10–20 cm high with lower leaves that become spinescent with falling of the leaflets. The leaves are linear, 8–11 cm long, with fifteen to twenty-five pairs of ovate to orbicular leaflets 3–6 mm long. The flowers are a bright sulfur yellow, about 20 mm long; the pod is oblong-lanceolate, appressed pubescent, 20–40 mm long, and tapering to a rigid beak (figs. CD.85, CD.86).

mlēlah (Shammar), *Andrachne telephioides* L. Euphorbiaceae. 215, 809, 2879. This glabrous, prostrate perennial herb, sometimes woody at base, is glaucous and bluish green with stems spreading from the base. The leaves are obovate to suborbicular, 2–6 mm long; the flowers are grouped one to three in the axils and are 2–3 mm wide, with petals shorter than the sepals. The fruit is an obscurely three-lobed, depressed-globose capsule 1–3 mm in diameter. This plant is locally frequent on silty basins.

msēkah (gen.). This generic is a feminine diminutive from ***misk,*** "musk." The name is apt because the strong, unpleasant scent of all parts of this plant have an animal accent, reminding me of the American skunk. Synonyms also emphasize various aspects of the odor: ***zgēgah*** (Āl Murrah), diminutive from ***zigg,*** "turd," thus "turdlet weed"; ***frēthah*** (Musil 1927, 599, from the Ruwalah), from ***firth,*** "stomach contents, offal"; and ***zifrah*** (Shammar), from ***zafr,*** "filthy."

Haplophyllum tuberculatum (Forssk.) A. Juss. Rutaceae. BM 1692, BM 3138, BM 3145. This erect or ascending pubescent perennial usually has several branches coming from a somewhat woody base and is 15–50 cm high. The leaves are highly variable

in shape and size, from suborbicular to linear, up to 4–5 cm long, and dotted with glands. The flowers are a bright sulfur yellow, about 8 mm broad, and grouped in a terminal, flat-topped inflorescence. The plant is well known for its powerful odor, and it is used medicinally to treat scorpion stings (figs. CD.197, CD.198).

nagīʿ (gen.). An Āl Wahībah tribesman of the southern Rubʿ al-Khālī (a speaker of southern Arabic) used the variant ***naggīʿ.***

Blepharis ciliaris (L.) B. L. Burtt. Acanthaceae. BM 1028. *Blepharis* is a rigid, spiny-prickly perennial herb, much branched from the base, and 10–30 cm high. Its leaves are oblong or lanceolate, tapering at the base. The flowers, 2–2.5 cm long, have blue, darker-veined corollas; they are in dense spikes and are exceeded by acuminate, veined bracts 3–5 cm long. The plant has a southerly distribution and is rare in our area (fig. CD.95).

najīl (Ruwalah). A Qaḥṭānī consultant used the synonym ***thēyyil.***

Cynodon dactylon (L.) Pers. Gramineae. K 14, BM 3132, BM 3085. This perennial grass spreads widely by creeping rhizomes and stolons, rooting at the nodes and sending up shoots to 30 cm high. The inflorescence is of digitate spikes, usually four to five together, with imbricated spikelets. This common, cosmopolitan weed grass is usually found around cultivation, but it may be seen also in remote desert around old camp locations and other disturbed sites.

sharī (Āl Murrah, gen. southern). Tribes of northern Arabia use the synonym ***ḥanḏal.***

Citrullus colocynthis (L.) Schrad. Cucurbitaceae. 230, 1085. *Citrullus,* the common wild gourd of eastern Arabia, is a tendril-bearing, creeping perennial with stems sometimes more than 1 m long. The leaves are alternate, ovate or triangular-cordate in outline, 3–10 cm long, and parted into three to five main lobes. The flowers are solitary and yellow. The fruit is a globose, smooth gourd, striped green and yellow-white, and 4–10 cm in diameter; it turns yellow and hollows when drying. The seeds of this common colocynth gourd are used medicinally as a laxative (fig. CD.122).

shuwwēl (gen.). Names with the root *sh w l* often refer to narrow, curved structures such as a scorpion's tail and plants with elongated spicate inflorescences such as *Reseda* species. A she-camel is said to be ***shāyilah*** when she raises her tail upward in a curved

arc when approached, which is said to be a sign of pregnancy. The name here may refer to this plant's elongated, tail-like side stems, some terminating in rather narrow spikes of flowers.

Cressa cretica Convolvulaceae. BM 23, BM 1099, BM 2958. *Cressa* is an erect or ascending perennial, gray-green with both appressed and spreading hairs, and 10–30 cm high. The leaves are ovate to lanceolate, sometimes subcordate, and 3–6 mm long. The flowers are 5–6 mm long, white to cream, with exserted stamens; they are grouped in short, dense, spikelike racemes at the stem apices. *Cressa* is a somewhat weedy plant of saline ground.

umm at-trāb (Ruwalah, Musil 1927, 628). From ***umm,*** "mother," + ***at-trāb,*** "the earth, soil," thus "mother of the soil," referring to the grains of soil or sand always adhering to this viscid plant. Members of tribes in the more central parts of our study area might call this plant ***drēmā*** (q.v.) or ***ḥlēwā,*** names often used for other species of *Fagonia.*

Fagonia glutinosa Del. Zygophyllaceae. BM 1170, BM 1358, BM 3121. This *Fagonia* is a prostrate perennial with stipular spinelets; it is glandular-viscid with adhering sand and is often purple tinged, with stems spreading up to about 20 cm long. The leaves are trifoliolate, with leaflets mostly obovate, 4–10 mm long, and mucronate. The flowers are 3–5 mm long with mauve petals, and the fruits are capsules 3–5 mm long (fig. CD.175).

11. Life form: ***'ishb*** (all annual plants)

abū nashr (Ruwalah; Musil 1927, 587). Probably from ***nashar,*** in the sense of "to saw, cut with a saw." From its parts, ***abū,*** "father," + ***nashr,*** "sawing," the name literally means "father of a sawing" or "saw-wort," referring to this plant's rough, retrorsely scabrous surfaces.

Galium ceratopodum Boiss. Rubiaceae. K 613, 3895. This *Galium* is an ascending, delicate annual, 10–30 cm high, with stems retrorsely rough-scabrous to the touch. The leaves are in whorls totaling five to seven, oblanceolate, mostly 5–15 mm long, with scabrous margins. The flowers are minute in the axils, the corolla having four white lobes. The fruit is a dark brown and tuberculate twin mericarp, sometimes single by abortion (fig. CD.183).

abū thrēb (Qaḥṭān). From ***abū,*** "father," + ***thrēb,*** diminutive of ***thirb,*** thus "father of a little ***thirb.***" The meaning of the word ***thirb*** in this context is unclear; it is classically glossed as "fat of the intestines" (of livestock). The consultant providing this name noted that "some people say ***umm thrēb***" (substituting the word ***umm,*** "mother," for ***abū***). A consultant of the Suhūl tribe gave me the latter form, but with the definite article, ***umm ath-thrēb*** (q.v.), for two species of *Hypecoum*.

Frankenia pulverulenta L. Frankeniaceae. BM 1463, BM 1741, BM 1827. This low, subprostrate annual is grayish green or often turning reddish, finely pulverulent with whitish glands or excreted salt crystals. The stems branch from the base and are 5–30 cm long; the leaves are opposite or whorled, oblong-oblanceolate, and 2–6 mm long. The flowers have a ribbed, tubular calyx 3–4 mm long and pink petals; the fruit is a capsule 2–2.5 mm long. This plant is of saline habitat and is seen most often on disturbed ground (fig. CD.180).

'anṣalān (gen.). Ruwalah and Shammar Bedouins of northern Arabia gave the variant ***'aṣanṣal.***

Dipcadi erythraeum Webb et Berth. Liliaceae. BM 50, BM 1203, BM 1815. This member of the lily family is a glabrous herb arising from an ovoid bulb 2–4 cm long. The scape is single and 10–20 cm long; the leaves, three to four in number, are narrowly linear and shining green, often exceeding the scape and accumbent on the ground. The flowers are grouped five to fifteen in a somewhat one-sided raceme with perianth 12–15 mm long, greenish brown to brownish coral. The capsule is broadly oblong, 12–15 mm long, with three rounded lobes (figs. CD.143, CD.144).

bābūnaj (gen.). According to Edward Lane, this name is from Persian *bābūnah*, chamomile ([1863–93] 1968, 1:145).

Matricaria aurea (Loefl.) Sch.-Bip. Compositae. 8118, 8606. This chamomile is a glabrous, sweet-aromatic annual, 5–25 cm high. The leaves are very finely dissected, being mono- or bipinnatisect in linear segments less than 1 mm wide. The heads are discoid, mostly terminal, dome shaped to rather high conical, and with yellow florets. Bedouins and villagers use this plant, closely related to European chamomile, to make a medicinal tea.

barwag (gen.). Āl Murrah consultants used the variant ***bērag.***

Asphodelus tenuifolius Cav. Liliaceae. BM 1299, BM 1675, BM 1832. This asphodel is an erect glabrous annual with scapes solitary or several, often branched above. The leaves are numerous from the base, narrowly linear, and mostly one-third to one-half as long as the scapes. The flowers are loosely racemed with a perianth about 3 mm long, the lobes white with a purple medial nerve. The fruit is a nearly globose capsule about 3 mm in diameter. Livestock reportedly avoid this weedy plant, which is common on disturbed ground around old campsites. It is used in the preparation of ***igṭ,*** dried cheese cakes. The same name may be applied also to two smaller, less common *Asphodelus* species: *A. refractus* Boiss. (8103, 8566) and *A. viscidulus* Boiss. (BM 1410, BM 1484) (figs. CD.75, CD.76).

basbās (gen.). Violet Dickson recorded the synonym ***umm ḏrūs,*** from ***umm,*** "mother," + ***ḏrūs,*** "teeth," thus "mother of teeth" (1955, 19), doubtless in reference to this plant's hardening, teethlike dispersal units.

Anisosciadium lanatum Boiss. Umbelliferae. BM 1281, BM 1238, BM 3116. This ascending or decumbent pubescent annual grows to about 40 cm high. The leaves are ovate-oblong in outline and bi- or tripinnatisect into linear lobes. The flowers are white, in dense, dome-shaped umbels that are axillary and with eight to eighteen rays. The ten to eighteen pedicels harden together in maturity to parallel columns to form a cylindrical dispersal unit 6–10 mm long. The plant has some medicinal uses (figs. CD.66, CD.67).

da'ā' (gen.). For the application of this name by Shammar and the Ruwalah as a folk specific, see the generic ***samḥ***. ***Da'ā'*** is included here also as a generic because that is its usage in our core study area, where edible ***samḥ*** seed is not collected.

Aizoon canariense L. Aizoaceae. BM 1208, BM 3165, 7736. This *Aizoon* is a procumbent, pubescent papillose annual with stems rather stiff and zigzagged, branching from the base. The leaves are alternate, spathulate to oblong-obovate, and 1–2 cm long. The flowers are sessile, apetalous, greenish outside but yellowish within; the flowering perianth is 3–5 mm long with triangular lobes. The fruit is a flattish capsule, star shaped at the apex (fig. CD.52).

dhanabān (Āl Murrah). From ***dhanab,*** "tail," + ***-ān,*** denoting similarity, thus "tail-like," referring to these plants' tail-shaped spiciform flowering racemes. The name is applied to several plants of the family Resedaceae that have tail-like flowering racemes. A Marrī consultant gave the variant ***dhanābah*** for *Oligomeris linifolia*.

Oligomeris linifolia (Vahl) Macbride. Resedaceae. BM 188, BM 1288, BM 1665. This ascending to erect glabrous herb is 5–30 cm high, with solitary or fascicled linear leaves 1–4 cm long. The flowers are white, in spiciform terminal racemes, and the fruit is a depressed-globose sessile capsule, with four teeth at the mouth.

Reseda arabica Boiss. Resedaceae. K 387, BM 1475, BM 1769. This annual *Reseda* is an ascending or erect glabrous herb, 10–30 cm high. The leaves are entire-oblanceolate or distally ternate, sometimes wavy margined. The white-petaled, pedicillate flowers are in elongated terminal racemes, and the three-toothed capsules are pendulous, globose-ellipsoid, more or less gaping, and 5–10 mm long (fig. CD.273).

Reseda decursiva Forssk. Resedaceae. BM 612, BM 1691, BM 1706. This decumbent to erect glabrous herb is 6–30 cm high. The leaves are rosetted at the base and pinnately divided with narrowly oblong to linear lobes. The white-petaled flowers are subsessile in dense, spikelike terminal racemes. The capsules are 4–6 mm long, ovoid, with four teeth at their gaping mouths.

dmāgh al-jarbū' (north; V. Dickson 1955, 39). From ***dmāgh,*** "brain," + ***jarbū',*** the jerboa (kangaroo rat, *Jaculus jaculus*), thus "jerboa's brain." The name refers to the plant's peculiar nutlets, which when mature are glossy gray-green, tubercled, and furrowed in a way that resembles a miniature brain. Musil recorded the synonym ***'ishbat ar-rās*** (1927, 598), the construct form of ***'ishbah,*** "herb, annual plant," + ***rās,*** "head," thus "headwort," probably in reference to the same feature of the nutlets.

Lappula spinocarpos (Forssk.) Aschers. Boraginaceae. BM 1372, BM 1632, BM 3080. This erect to ascending-decumbent dwarf annual grows 3–15 cm high and has linear to linear-spathulate leaves 1–3(5) cm long. The flowers are solitary or in loose racemes; the corolla is 3–4 mm long, with the limb blue or sometimes whitish.

The calyx grows in fruit to exceed the nutlets, which are triquetrous-pyramidal and about 4 mm long (fig. CD.218).

fānī (Āl Murrah). Musil in northern Arabia recorded for this plant the name ***umm ar-rwēs*** (1927, 628), from ***umm,*** "mother," + ***ar-rwēs,*** diminutive of ***ar-rās,*** "the head," thus "mother of the little head," doubtless referring to the fruiting heads' globular form.

Scabiosa palaestina L. Dipsacaceae. BM 603, BM 1228, BM 1602. This erect annual scabious is 5–45 cm high, with the main stem branched above. The leaves are linear-oblong to lanceolate and 2–8 cm long, the lowest sometimes being divided. The flowers in the plants of our study area are yellowish white, fragrant, and 12–15 mm long, grouped in heads 1.5–3 cm in diameter. The fruiting heads are more or less globose with prominent membranous coronas that are 8–10 mm long and that have thirty to thirty-five nerves (figs. CD.298, CD.299).

gaḥwīyān (gen.). This generic is applied to two very similar species of *Anthemis* (Compositae).

Anthemis melampodina Del. BM 1492, BM 3776, BM 3846. This pubescent or tomentose ascending annual is 5–25 cm high. The leaves are oblong in outline, 1–3 cm long, and pinnatisect into linear lobes. The flowering heads are 2–3 cm broad with white ray petals and yellow disc. This well-known plant is rather common in the spring flora after good rains (figs. CD.68, CD.69).

Anthemis scrobicularis Yavin. BM 1446, BM 2831, BM 4080. This species is very similar to *A. melampodina* but differs by its non-tuberculate, longitudinally ribbed achenes (figs. CD.68, CD.69).

garnuwah (Banī Hājir). Derived from ***garn,*** "horn," in reference to the long, pointed fruit beaks, resembling long horns. The same name is used for a perennial plant, *Monsonia,* of the same family (q.v. under life form group 9 of this list).

Erodium laciniatum (Cav.) Willd. Geraniaceae. BM 536, BM 1436, BM 1681. This cranesbill is a grayish green procumbent to ascending annual with stems to about 30 cm long. The leaves are ovate in outline and 2–4 cm long, varying in lobation from dentate to pinnately divided. The flowers are in umbels with pink, rarely white petals 5–6 mm long. The fruit beaks are 30–45 mm long, and the achenes have two pits at the base (fig. CD.170).

ghrērā (Āl Murrah, Qaḥṭān). Formed from the diminutive of ***ghurrah,*** "blaze on the face of a horse." A consultant of Āl Murrah also used the synonym ***gurḥān,*** a variant of the classical adjective *aqraḥ,* fem. *qarḥā',* "having a blaze on the face (a horse)."

Eremobium aegyptiacum (Spreng.) Boiss. Cruciferae. BM 220, BM 1812, BM 3184. This decumbent to ascending branched and stellate-pubescent annual is 5–30 cm high. The leaves are linear, 5–45 mm long, and 1–3 mm wide. The flowers have petals 4–10 mm long, white to pink and mauve, sometimes tinged with yellow; the fruits are spreading or ascending linear siliques 10–35 mm long. Associated with sandy terrain, this plant is one of the few annuals with a distribution extending into the Rub' al-Khālī, where the flower color tends to be white (figs. CD.162–64).

gitt (gen.), *Medicago sativa* L. Leguminosae. 8077. This well-known fodder legume alfalfa or lucerne is an erect or ascending branched annual or perennial 20–90 cm high. The leaves are trifoliolate, with leaflets oblanceolate to oblong-linear and 10–35 mm long. The flowers are in dense spiciform racemes, lilac to violet to purple, and about 12 mm long. The pod is compressed, 4–8 mm in diameter, and usually tightly coiled and auger shaped. The English word *alfalfa* comes through Spanish from Arabic *al-fiṣfiṣah,* the latter of Persian origin, according to Muhammad Hamidullah (1973, 188). I would suggest that English *alfalfa* might also be interpreted as coming from Arabic *al-falāfil,* a plural of *fulful* or *filfil,* meaning "pepper," although the association is unclear. Edward Lane ([1863–93] 1968) says *fulful* is also derived from a Persian word. ***Gitt*** sometimes grows spontaneously along roadsides, and Bedouins occasionally purchase it as supplementary fodder. I place it here among the annuals because it is found as an occasional, spontaneous plant outside cultivation. I have no data on its life form when treated as a cultivated crop but think it unlikely that it would be included in the category ***'ishb.***

glēgilān (gen.). Nondiminutive variants include: from a Marrī consultant, ***gungulān;*** from Qaḥṭān and Banī Hājir, ***gulgulān.*** All these forms relate to classical *qalqala* or *taqalqala,* "to shake, tremble," referring to the way this plant's pods, on fine capillary pedicels, quake and tremble in the slightest wind (but the verb may derive from the plant name).

Savignya parviflora (Del.) Webb. Cruciferae. BM 1178, BM 1402, BM 1687. *Savignya* is an ascending, glabrous branched annual 10–40 cm high. Its lower leaves are obovate-oblong, sinuate or dentate; the upper leaves are narrower. The flowers are pink, with petals 4–6 mm long. The fruits are elliptical-oblong to suborbicular silicles, strongly compressed, and 8–14 mm long, on spreading capillary pedicels longer than the fruit (figs. CD.294–96).

grēṭā (Ruwalah, northwestern Arabia, per Musil 1927, 609). Āl Murrah, in our core area, would probably use the name ***yanam,*** which they tend to prefer for most species of this genus.

Plantago ovata Forssk. Plantaginaceae. BM 1515, BM 1658, BM 3148. This ascending, stemless annual, 5–15 cm high, has linear-lanceolate leaves 4–12 cm long, rosulate at the plant base. The flowering spikes are ovoid to cylindrical and 0.8–3 cm long, on scapes usually shorter than the leaves. The bracts of the spike are broadly white-scarious margined. The sepals are elliptic and scarious margined, and the corolla lobes are obovate and mucronate. The capsule is ellipsoid, about 3 mm long, with two boat-shaped seeds. The seeds have been used as a laxative (fig. CD.264).

gṭēnah (gen.). Diminutive singular of ***gaṭn,*** "cotton," referring to this plant's cottony-woolly appearance. Variant: ***guṭṭēnah*** (Qaḥṭān, Muṭayr). Synonyms recorded only for *B. eriophora*: ***ḥmēḏ̣at al-arnab*** (Qaḥṭān), ***ḥmēḏ̣ah,*** diminutive of ***ḥamḏ̣ah,*** "saltbush," + ***al-arnab,*** "the hare," thus "little saltbush of the hare"; ***ḥmēḏ̣*** (Āl Rāshid), diminutive of ***ḥamḏ̣,*** "saltbushes," "little saltbush"; ***ṭirf*** (Shammar). Synonyms recorded only for *B. muricata*: ***urēnibah*** (Ruwalah), diminutive fem. of ***arnab,*** "hare," "little hareweed"; ***lēbid*** (Qaḥṭān), from ***labad,*** "felt, wool," "feltweed"; ***dhinnabān*** (Banī Hājir), from ***dhanab,*** "tail" + ***-ān,*** denoting resemblance, "tailweed"; ***sh/hēbā*** (Shammar), diminutive of ***shahbā,*** "gray, fem.," "little grayweed." This generic applies to two species of the genus *Bassia* (Chenopodiaceae) with a focus on *B. eriophora,* which has the stronger cottony-woolly aspect. A consultant of the Muṭayr tribe also applied the variant ***guṭṭēnah*** to *Filago desertorum* Pomel (Compositae), which also has a gray-woolly appearance. Of particular interest here is the clear attribution of this plant (*B. eriophora,* at least) by some names to the ***ḥamḏ̣*** group of plants

(the saltbushes). The genus does indeed belong to the Chenopodiaceae, and this plant is one of the very few annuals classed as ***ḥamḍ.*** It is likely that a plant said to be used by the Ruwalah as fire-starting material and called ***gṭēn*** or ***gṭēyin*** (Musil 1928a, 128, 700) is also this species.

Bassia eriophora (Schrad.) Aschers. BM 1618, 8293, 8344. This *Bassia* is an ascending, cottony-villous annual to 5–20 cm high, the stems appearing as white columns of cotton with leaves partly hidden in the fleece. The leaves are narrowly oblong to elliptical and 8–14 mm long. Its flowers are clustered, hidden in dense fleece; the fruiting perianth is clothed in very dense white wool, falling as dispersal units resembling small balls of cotton (fig. CD.93).

Bassia muricata (L.) Aschers. BM 1233, BM 1435, BM 3147. This erect villous annual is 8–50 cm high and often somewhat frutescent. The leaves are grayish green, narrowly linear, and 5–15 mm long. The fleecy flowers are solitary or clustered in the axils; the fruit perianth is indurate, the lobes prolonged in spreading spinules 2–4 mm long and exserted from the fleece. The plant is most commonly seen on disturbed ground.

Filago desertorum Pomel. Compositae. 2048. Named in my data only by the variant ***guṭṭēnah*** (Muṭayr). This plant is a gray woolly-tomentose dwarf annual with oblong-spathulate leaves 5–12 mm long. The head clusters are densely white woolly or cottony and about 10 mm in diameter. The florets are about 1.5 mm long, and the inner achenes bear a pappus.

gurreṣ (aẓ-Ẓafīr). Cf. classical *qurṣ,* “disk of the sun, disk of metal (ornament),” which fits the appearance of this plant’s yellow discoid heads very well. A consultant of the Qaḥṭān tribe used the variant ***garrāṣ.***

Aaronsohnia factorovskyi Warbg. et Eig. Compositae. BM 1239, BM 1314, BM 1667. This very common annual herb grows 8–25 cm high and is branched at the base, with stems erect or decumbent. The leaves are much dissected, slightly succulent, and bipinnatisect into linear lobes about 1 mm wide. The flowering heads are discoid and hemispherical, mostly 6–8 mm in diameter, with bright yellow florets; they are solitary on numerous leafless peduncles exceeding the leafy stem parts. The plant is considered edible

and is sometimes eaten raw; it is also used in the preparation of ***igṭ,*** dried cheese cakes (fig. CD.45).

ḥambaṣīṣ (gen. at least in the north). Musil reported the shortened variant ***ḥamṣīṣ*** (1927, 602; 1928a, 697).

Rumex pictus Forssk. Polygonaceae. BM 1249, 3283, 4030. This dock of stable sands is a glabrous, often reddish, and somewhat brittle-succulent annual, 10–25 cm high, with many decumbent leaves from the base. The leaves are 1.5–4 cm long and pinnately parted; the flowers are clustered in the upper nodes, forming a spicate or narrowly racemose inflorescence. The fruit perianth is winged, 5–9 mm broad, and pink or turning yellow, the valves with a medial, elongated wart. The plant is considered edible and eaten raw (fig. CD.281).

ḥambiẓān (gen.). Variants: ***ḥimbāẓah*** (Shammar), ***ḥumbēẓ*** (Ruwalah), ***'ambaṣīṣ*** (*sic,* Āl Murrah).

Emex spinosa (L.) Campd. Polygonaceae. BM 1292, BM 1386, BM 1680. Of the rhubarb family, this glabrous annual, 5–20 cm high and sometimes tinged reddish, grows single stemmed with a basal rosette of leaves. The taproot is thick, carrotlike, whitish, and fleshy. The leaves are ovate to oblong, 1–6 cm long; the flowers are clustered in the axils. The perianth grows in the fruit, with three segments indurating and with recurved spinules 1–3 mm long. This plant is one of the best-known edibles, the sweet, carrotlike taproot being consumed raw (fig. CD.159).

ḥanwah (Shammar, Banī Hājir). From ***ḥanū,*** "crook, bend," probably referring to the hooked shape of the maturing achenes of this plant. A synonym is ***'ishbat al-ghurāb,*** from ***'ishbah,*** "annual plant," + ***al-ghurāb,*** "the crow or raven," thus "crow-wort" (northern tribes, Musil 1927, 598).

Calendula tripterocarpa Rupr. Compositae. BM 1246, BM 1403, BM 1509. This marigold is a decumbent to ascending annual, usually glandular-pubescent, with stems 5–25(40) cm long. The lower leaves are oblanceolate to linear-oblong, mostly 2–5 cm long, and obscurely serrate to entire. The flowering heads are 0.5–1.5 cm wide with florets yellow to rich orange; the ripening fruits include some achenes that have three wings. This plant is considered dangerous to livestock, causing digestive ailments (fig. CD.98).

harās (Banī Hājir, Qaḥṭān). Cf. classical *harasa,* "to crush, bruise." Synonym: ***ḏrēsah,*** diminutive fem. of ***ḏirs,*** "tooth" (recorded by Violet Dickson as "Al Thraisa" [1955, 83]). Both names refer to this plant's peculiar, macelike, rounded, spiny fruiting heads.

Sclerocephalus arabicus Boiss. Caryophyllaceae. BM 1159, BM 1280, 7510. This distinctive annual is procumbent or ascending and glabrous, with stems rather rigid and 2–10(15) cm long. The modified leaves are terete-linear, 4–15 mm long, and mucronate with scarious stipules. The flowers are in dense spherical heads, 0.7–1 cm in diameter, that become hardened and spiny in fruit (fig. CD.302).

ḥārrah (Ruwalah, Musil 1928a, 697). From ***ḥārr,*** "hot," perhaps referring to this crucifer's hot, mustardy taste.

Sisymbrium irio L. Cruciferae. 8097, 8583. This erect, branched annual is 15–50 cm high and sparsely pubescent. The basal leaves are lyrate-pinnatifid or dentate, with a hastate terminal lobe; the flowers are minute, with yellow petals about 2 mm long that hardly exceed the calyx. The erect-spreading fruits are 20–45 mm long and 1 mm wide. This weedy plant is found in the desert only on disturbed ground, such as around campsites.

ḥaṣād (Qaḥṭān, gen.), *Avena sativa* L. Gramineae. 434, BM 1070. This is the common cultivated oat, an annual grass with erect glabrous culms and glabrous leaf blades. The spikelets are in a spreading or nodding panicle and either have one awned lemma or may be awnless. This oat is found outside cultivation only as an occasional escape, but it is known to Bedouins who occasionally purchase the grain as fodder. With respect to this plant's life form assignment, see ***ḥinṭah.***

ḥassār (aẓ-Ẓafīr). Cf. classical *ḥasīr,* "tired, weak," the name possibly referring to this plant's limp, soon falling petals. Violet Dickson recorded "Bakātari" in place of what appears to be the name ***bakhatrī*** (cf. classical *bakhtarī,* "elegant, beautiful") for this species in Kuwait territory.

Roemeria hybrida (L.) DC. Papaveraceae. BM 1368, BM 1501, BM 1641. This annual of the poppy family is erect or ascending and 10–30 cm high, often with stiff, whitish, erect hairs. The leaves are 3–5 cm long and deeply pinnatisect into linear lobes. The flowers

have deep violet petals that are 0.8–2 cm long, thin, fragile, and soon falling. The 2–4 cm long capsule often bears stiffish hairs (figs. CD.278, CD.279).

ḥinṭah (gen.), *Triticum aestivum* L. Gramineae. 7892. The synonym ***gamḥ*** was given for this species. This cultivated wheat is an annual grass with culms to 100 cm high (but often about 40 cm in our area) and leaf blades to 2 cm broad in cultivation. The inflorescence is a spike with two rows, the spikelets having an awn or tooth at the apex. Wheat has become very common in commercial cultivation in our study area since the 1980s and is known to all Bedouins. It sometimes grows as an escape along roadsides from spilled grain. I have no data indicating the life form of this cultivated plant. It is placed here among the ***'ishb*** on the basis of its annual habit and occasional appearance spontaneously on disturbed desert sites. It is probable that this plant and other cultivated grains such as barley and oats are placed outside the category ***'ishb,*** which properly seems to apply only to wild plants.

ḥōdhān (gen.). A synonym heard once from a consultant of Āl Murrah is ***ḥuwwā,*** but the latter is generally applied to *Launaea* species.

Picris bablyonica Hand.-Mazz. Compositae. BM 1151, BM 1513, BM 1697. This common ascending annual, 5–30 cm high, is overall hispid with short bristles. The basal leaves are rosulate, oblong-lanceolate in outline, runcinate-pinnatifid, and 3–8 cm long. The heads are solitary-terminal with bright yellow, broadly spreading florets; they are sometimes dark centered with immature florets. The fruit is a beaked achene that bears a pappus of ten to fifteen plumose bristles. It is a common and rather conspicuous member of the annual flora (figs. CD.259, CD.260).

ḥrēshā (Kuwait area, as recorded in V. Dickson 1955, 26). Diminutive of ***ḥarshā*** (fem. adj.), "rough, coarse," referring to this plant's rough texture, thus "rough-weed." A member of the Shammar tribe gave me the name ***khafsh*** for the same species, a name he applied also to the somewhat similar rough, yellow-flowered crucifer *Diplotaxis harra*.

Brassica tournefortii Gouan. Cruciferae. BM 989, BM 1177, BM 1332. This ascending, branched annual, 20–75 cm high, has a basal rosette of leaves that are lyrate-pinnatifid with dentate,

rough-hispid lobes. The stem leaves above are entire and smoother. The flowers are yellow, sometimes tinged violet, with petals 5–7 mm long. The fruits are beaked siliques 20–70 mm long.

ḥsēkah (Āl Murrah). Nondiminutive variant: ***ḥasak*** (Ruwalah, Qaḥṭān). The name ***nafal,*** usually applied to *Trigonella,* was heard once for this plant from a Bedouin of Āl Murrah.

Medicago laciniata (L.) Mill. Leguminosae. BM 1195, BM 1512, BM 1816. This common annual is prostrate to decumbent, with stems 5–30 cm long. It has trifoliolate leaves with cuneate to obovate leaflets 3–10 mm long. The flowers are yellow, and the pod is a spheroid or ovoid coil, 3–6 mm across with dense, interlacing prickles (fig. CD.236).

ḥulbah (gen.). The root *ḥ l b* is basically related to "milk," but the association of milk with this plant is unclear.

Trigonella foenum-graecum L. Leguminosae. 378. Fenugreek, a cultivated plant, is an erect herb to about 30 cm high. Its leaves are trifoliolate, with leaflets obovate to oblong, 10–30 mm long, and dentate above. The flowers are solitary or paired in the axils, 13–18 mm long, with white to cream corollas. The pod is erect, 6–12 cm long, somewhat compressed, and tapering to a straight beak 2–3 cm long. This plant is cultivated in the oases, but it is known to Bedouins and is sometimes considered a medicinal.

ḥummēḍ (gen.). From ***ḥāmiḍ,*** "sour." Variant: ***ḥammāḍ.*** The name ***ḥambaṣīṣ*** may also be used for this plant.

Rumex vesicarius L. Polygonaceae. 397, 1204, 2761. This dock is a glabrous, somewhat succulent annual, 10–30 cm high, with leaves ovate to deltoid and up to about 6 cm long. The flowers are clustered in the upper axils, forming dense racemes. The perianth grows in fruit, becoming showy greenish yellow when young but later bright pink to reddish, with red-nerved wings about 2 cm broad. This sour-tasting plant is edible raw and also used in the preparation of ***igṭ,*** dried cheese cakes (figs. CD.282–84).

ḥurbuth (gen. south). A synonym used among tribes of the north is ***gafʿā*** (cf. *qafʿāʾ* [fem. adj.], "shriveled, shortened, drooping"). The name ***ḥurbuth*** is applied in our study area to at least eleven species of annual legumes with a focus on several annual species of *Astragalus,* in particular those with characteristic elongated, usually more

or less curved fruit pods. The following list may be incomplete to a slight extent and is provided with abbreviated descriptions. This generic is unusual in being possibly polytypic to a slight degree, including one species of *Astragalus* distinguished by a specific name (but see section 5.3 for a discussion).

Generic: ***ḥurbuth***

Quasi-specific: ***abū khawātīm*** (Āl Murrah), from ***abū,*** "father" + ***khawātīm,*** pl. of ***khātim,*** "signet ring, seal," thus "father of seal rings," referring to the plant's circular, flattened, ringlike pods. Bedouin children wear the "rings" on their fingers in play. A synonym is ***aṣābi' al-'arūs*** (V. Dickson 1955, 20), from ***aṣābi',*** "fingers," + ***al-'arūs,*** "the bride," thus "bride's fingers," referring to the reddish purple flecks on the pods resembling the henna-stained fingers of a bride decorated for her wedding.

Astragalus annularis Forssk. BM 1487, BM 1694, BM 1799. This vetch has obovate-elliptical leaflets in one to three pairs. The flowers are pink to red-purple, and the fruits are strongly compressed dorsoventally, irregularly streaked with purple flecks, and curved into a ring shape (fig. CD.78).

The following species form a residuum in which only the generic name, ***ḥurbuth,*** is used for each:

Astragalus corrugatus Bertol. K 591, BM 1362, BM 1389. The oblong and truncate-retuse leaflets in this vetch are in five to nine pairs. The flowers are pink or cream to blue-violet with some white; the pods are curved-linear, 20–35 mm long, and reticulate-rugose.

Astragalus eremophilus Boiss. Leguminosae. K 8003, 8041, 8055. This annual has obovate to oblong leaflets in five to seven pairs. The cream to pinkish flowers are grouped one to three in axillary racemes; the pods are linear, nearly terete, hairy, and curved to a half-circle (fig. CD.79).

Astragalus hauarensis Boiss. BM 1696, BM 1838, BM 3304. This procumbent to decumbent annual has stems 5–20 cm long; the imparipinnate leaves have appressed-pubescent, obtuse, and retuse leaflets in one to four pairs. The flowers are pink or pink-violet, sometimes tinged with yellow. The pods are subsessile, linear and strongly curved, pubescent, and 20–30 mm long. This plant is perhaps the most common *Astragalus* of sandy habitats (fig. CD.80).

Astragalus schimperi Boiss. BM 1265, BM 1750, BM 3305. This vetch has elliptical leaflets in four to eight pairs. The flowers often have a pink standard and whitish wings and keel and are grouped in a headlike inflorescence. The pods are linear, subterete, moderately curved, and pubescent; they often form radiate clusters (figs. CD.83, CD.84).

Astragalus tribuloides Del. K 600, BM 617, BM 1655. The leaflets of this *Astragalus* are elliptical and in five to eight (ten) pairs. Its flowers are white to pink in sessile clusters of two to six; the pods, also in sessile stellate clusters, are oblong, dilated at the base, and pubescent.

Hippocrepis bicontorta Lois. Leguminosae. BM 1194, BM 1437, BM 3180. Violet Dickson recorded the name ***umm al-grēn*** for this plant among Bedouins of Kuwait, treating it as a generic (1955, 50). This name is from ***umm,*** "mother," + ***al-grēn,*** "the little horn," thus "mother of the little horn" or "hornwort," referring possibly to the hornlike protuberances along the edge of the pod, although Dickson noted a resemblance to a Bedouin hairstyle of a similar name. Musil provided two other generic-level names for this species in northwestern Arabia: ***khurēmā*** (Musil 1927, 605), meaning "pierced-weed," and ***garnah*** (Musil 1928b, 368), meaning "hornwort." These names may be used only by the more northern tribes; my Āl Murrah and Qaḥṭān consultants called this species simply ***ḥurbuth.*** This horseshoe vetch has leaflets that grow in three to five pairs and are 8–15 mm long, linear to oblong, with emarginate apices. The flowers are yellow and in umbels of three to four; the pods are strongly compressed, contorted, and coiled, with horseshoe-shaped sinuses bordered by hornlike processes (figs. CD.205, CD.206).

Hippocrepis constricta Kunze. 8009, 8039, 8073. This species, less commonly seen than the previous *Hippocrepis* species, has leaflets in two to three pairs and pods that are straight or only slightly curved, not spiraled and contorted like those of *H. bicontorta* (fig. CD.207).

Hippocrepis unisiliquosa L. BM 3082. This horseshoe vetch has straight pods like *H. constricta* but differs from the previous two species in having both flowers and pods sessile in the axils. This species is rare in our area and so far known only in the far

northern part of the area, from a ravine leading down to the depression of al-Bāṭin.

Lotus halophilus Boiss. et Sprun. Leguminosae. BM 1261, BM 1621, BM 3295. This *Lotus* is a prostrate or decumbent pubescent annual with sessile quinquefoliolate leaves of which the lower pair are stipulelike. The flowers are yellow, and the pod is glabrous, linear-cylindrical, slightly curved, and a shining dark brown when ripening (fig. CD.227).

Ononis serrata Forssk. Leguminosae. BM 1412, BM 1722, BM 1797. This glandular-hairy annual has trifoliolate leaves and leaflets that are oblong, serrate, and 6–10 mm long. The flowers are solitary in the axils and are pink with a white keel; the oblong pod is glabrous and hardly exceeds the calyx. As in the case of *Hippocrepis*, this plant has also been recorded with a different generic-level name outside our core study area. Musil (1927, 628) gives, from northwestern Arabia, ***umm idhn,*** from ***umm,*** "mother (of)," and ***idhn,*** "ear," thus "earwort."

ḥuwwā (gen.). Cf. classical *aḥwā,* fem. *ḥawwā',* "dark green," possibly referring to the dark green color of the leaves (or perhaps the color was so called after the plant). The generic is applied to three species of *Launaea* (Compositae), with a focus on *L. capitata*.

Launaea capitata (Spreng.) Dandy. BM 1150, BM 1473, BM 1794. This glabrous, usually procumbent annual may be stemless or with stems 5–15 cm long. The leaves are rosulate, 2–7 cm long, oblong to spathulate in outline, and runcinate-pinnatifid, with cartilaginous, denticulate margins. The flowering heads are yellow and may be basal or at the ends of stems. This plant has been considered edible but of poor quality (fig. CD.220).

Launaea nudicaulis (L.) Hook. f. BM 813, BM 3111, BM 3176. This glabrous plant is technically a perennial but seems generally to be considered part of the annual flora. It is ascending and 20–50 cm high or sometimes larger when scrambling on rocks. The leaves are rosulate, oblong, and runcinate-pinnatifid, with triangular dentate lobes. The flowering heads are numerous on the upper stems, and the ligules are yellow but whitish on their backs. The fruits are achenes of two types: one columnar-tetragonal and the other compressed and darker (fig. CD.223).

Launaea procumbens (Roxb.) Ramayya et Rajagopol. K 637, BM 1456, BM 1909. This is another glabrous perennial that is treated as a kind of ***'ishb*** because it is inconspicuous except in the spring season. The plant is procumbent, decumbent or ascending, 10–30 cm high, and sometimes tangled and shrubby at base. The leaves are mostly basal and rosulate, sinuate-dentate to runcinate-pinnatifid with callose margins, and 4–15 cm long. The yellow-flowered heads are usually clustered.

ḥwērrah, Kuwait area, as recorded by Violet Dickson (1955, 59). The name is a diminutive feminine adjectival form of ***ḥārr,*** "hot." Variations on this theme are often applied to crucifers in reference to their generally "hot" taste.

Leptaleum filifolium (Willd.) DC. Cruciferae. BM 1364, BM 1554, BM 1637. This plant is a compact dwarf annual 2–15 cm high. The leaves, 2–5 cm long, are extremely narrow-linear to filiform. The flowers are white to pink; the fruits are linear siliques 15–25 mm long and 2–3 mm wide.

'ifēnah (Muṭayr), cf. *'afin,* "putrid, moldy," *Vicoa pentanema* Aitch. et Hemsl. Compositae. K 624, 8115. This erect or ascending branched annual has white spreading hairs and purplish stems. The basal leaves are oblong-spathulate, entire or dentate, and mostly 2–4 cm long; the stem leaves are smaller. The villous, yellow flowering heads are numerous, mostly terminal, and about 6–7 mm long and broad. The plant is generally found as a weed around the edges of cultivation or at roadsides.

'ishbat umm sālim (Ruwalah; Musil 1927, 598). From ***'ishbat,*** a construct form of ***'ishbah,*** "herb, annual plant," + ***umm,*** "mother," + Sālim (male personal name), thus "the mother of Sālim." ***Umm sālim*** is the name of the bifasciated or hoopoe lark *(Alaemon alaudipes),* conspicuous by its rising song and spiraling breeding display in the springtime desert. In my experience, Bedouins consider it a "good bird" and avoid harming it in any way, telling boys, for example, not to shoot at it with their air rifles. The name of the plant thus means "herb of the hoopoe lark," but why it is associated with the bird and why the bird is "the mother of Sālim" are unclear. A member of my family vaguely remembers a story told by Saudi Arabs at Dhahran about ***umm sālim,*** "the desert bird,"

and ***umm turkī,*** "the town bird." Musil related a folk anecdote told by the Ruwalah about the bird ***umm sālim,*** which I paraphrase: Umm Sālim asked the ant to provide some of its collected seeds to help feed her chicks. But the ant refused, saying "I am working all the time, while you do nothing but sing." Umm Sālim replied: "Yet my voice is more precious than the whole of your ragged tail" (1928a, 41).

Notoceras bicorne (Ait.) Amo. Cruciferae. BM 751, BM 1495, BM 1564. *Notoceras* is an appressed hairy prostrate or decumbent annual, branching at base with stems to 20 cm long. The leaves are oblanceolate, tapering to the base, and 15–30 mm long. The flowers are in terminal racemes and have white to yellowish petals less than 2 mm long. The fruits are appressed to the stem and 6–7 mm long, somewhat compressed and constricted between the seeds, and with two diverging horns at the apex.

jahag (Shammar), *Diplotaxis acris* (Forssk.) Boiss. Cruciferae. BM 602, BM 1605, BM 3115. This erect glabrescent annual grows 5–50 cm high with somewhat fleshy, obovate to oblong, and dentate leaves, mostly at the base of the plant. The flowers are in an often flat-topped terminal inflorescence with pink-purple petals. The fruits are ascending siliques, 20–50 mm long and 2–3 mm wide, on pedicels 7–15 mm long (figs. CD.145–47).

jirjīr (Qaḥṭān), *Eruca sativa* Mill. Cruciferae. 546, 7976, 8427. This erect annual is 10–50 cm high, its lower leaves pinnatifid with a large terminal lobe, the uppers entire or serrate. The flowers have petals that are 15–20 mm long and are cream or yellowish with greenish to violet veins. The fruits are siliques 15–25 mm long and 3–5 mm wide, appressed to the stem, and with a compressed beak. It is a weed usually seen in cultivation but sometimes along roadsides in spring. Musil reported that Ruwalah tribesmen used this name for *Senecio glaucus* L. subsp. *coronopifolius* (Maire) Alexander (1928b, 343).

jirrēd (aẓ-Ẓafīr, other northern tribes). This generic is applied to two annual species of *Helianthemum* (Cistaceae). It may possibly be used sometimes also for the perennial species *H. lippii* and *H. kahiricum*. Conversely, the name ***ragrūg*** may apparently be used sometimes for the annual species (see ***ragrūg,*** under life form ***shajar,*** given earlier).

Helianthemum ledifolium (L.) Mill. BM 744, BM 1425, BM 1642. An erect pubescent annual 5–20 cm high, this plant has elliptical-lanceolate leaves to 15 mm long. The flowers are 5–8 mm long, and the fruits are ovoid capsules that are ciliate along the upper margins of the valves and about 7 mm long. Like other species of *Helianthemum*, this species is an indicator plant for desert truffles (figs. CD.339, CD.340).

Helianthemum salicifolium (L.) Mill. BM 1306, BM 1522, BM 1701. This plant is another ascending and pubescent annual 5–25 cm high. Its leaves are ovate to lanceolate and up to 20 mm long. The flowers are distant, in terminal racemes, with inner sepals 4–6 mm long; the capsule is globose-ovoid and 4–5 mm long. Like *H. ledifolium,* this species is an indicator plant for desert truffles.

jurrēs (Ruwalah; Musil 1927, 601). From ***jrēs,*** diminutive of ***jaras,*** "bell," referring to the unusual shape of the plant's heads, which are enclosed by the erect and incurving involucral bracts, forming a sphere. The shape is in fact very suggestive of some bells made of brass in India that are spherical with multiple ribs.

Atractylis cancellata L. Compositae. BM 1617, 2784, 8123. This small thistle is an ascending annual, branched from the base and 4–25 cm high. The basal leaves (when present) are spathulate and prickly dentate; the stem leaves are linear-oblanceolate, prickly dentate, and 1.5–2.5 cm long. The flowering heads are discoid and terminal with pink or purple florets. The outer involucral bracts are pectinate-pinnatisect and prickly spinescent; they grow erect and incurving to enclose the head (fig. CD.89).

kaftah (gen.). Cf. classical *inkafata,* "to contract, become compact," which well describes the plant's action and form when drying (but the verb may have come from the plant name). This widely known plant has many synonyms, the more generally known of which is ***kaff maryam,*** from ***kaff,*** "hand, palm," + ***maryam,*** "Mary" (the mother of Jesus), thus "Mary's hand." Other names used are: ***birkān, barukān*** (Shammar); ***jmēʿ fāṭmah,*** from ***jmēʿ,*** diminutive of *jumʿ,* "fist," + ***fāṭmah,*** "Fatimah" (doubtless referring to the daughter of the Prophet Muḥammad by his first wife, Khadījah), thus "Fatimah's little fist"; ***kaff al-ʿadhrā*** (V. Dickson 1955, 16), from ***kaff,*** "hand, palm," + ***ʿadhrā,*** "maiden, virgin," thus "virgin's

hand" (another reference to Mary, the mother of Jesus); ***kafn, gufē'ā*** (Qaḥṭān), the latter the diminutive of ***gaf'ā,*** "shriveled, contracted"; ***gnēfidhah*** (Ruwalah; Musil 1926, 357), the diminutive of ***gunfudh,*** "hedgehog," thus "little hedgehog" (the hedgehog contracts into a ball when frightened). The several references to "hand" or "fist" refer to the hand of Mary or Fatimah clenched in pain at childbed. The dried plant is widely used in Arabia as a medicinal or charm to ease childbirth.

Anastatica hierochuntica L. Cruciferae. BM 1494, 2106, 2238. *Anastatica* is a stellate-pubescent dwarf annual, branched radially from the base; it is prostrate or decumbent and often about 15 cm across, the branches contracting inward after maturity to form a tight, woody ball. The leaves are oblanceolate to obovate and up to about 3 cm long. The white flowers have petals about 3 mm long; the fruit is 4–6 mm long, with an earlike appendage on each side and a persistent style (figs. 4.11, CD.63–65).

kaḥīl (gen.), also ***kaḥal, kaḥlā*** (Āl Murrah, Banī Hājir). Synonym: ***'ishbat al-ḥamām*** (Musil 1927, 598), from ***'ishbat,*** construct form of ***'ishbah,*** "herb, annual plant," + ***al-ḥamām,*** "the doves," thus "herb of the doves." The name ***kaḥīl*** means "anointed with ***kuḥl,***" the fine black powder widely used in the Arabian Peninsula and elsewhere in the Middle East as an eye cosmetic or medicinal. Kohl is often described as powdered antimony or an antimony compound, but recent chemical analyses of samples from the gulf area have shown major ingredients to be powdered galena (lead sulfide) or amorphous carbon (Hardy et al. 1998; Hardy, Sutherland, and Vaishnav 2002). The term ***kaḥīl*** and variants as applied to these plants is in the more general sense of "colored ointment" or "cosmetic" and is otherwise unrelated to the eye cosmetic known as ***kuḥl.*** The name ***kaḥīl*** labels a complex of five boraginaceous plants, four of them *Arnebia* species, which have taproots with a staining red pigment on their epidermis. Bedouin women and girls rub the roots on their faces as a rougelike cosmetic (see section 4.6). The focus of the name appears to be on *Arnebia decumbens* and *A. linearifolia,* the species most commonly used as cosmetics. I also recorded the names ***fānī*** (from a southern Arabic–speaking tribesman of Āl Rāshid) and ***fnūn*** (Qaḥṭān), both for *Arnebia hispidissima*.

Arnebia decumbens (Vent.) Coss. et Kral. BM 1604, BM 1820, BM 3311. This hispid ascending annual is 5–30 cm high, with lower leaves linear-oblong to linear-lanceolate and 2–7 cm long. The flowers are yellow, growing in dense, one-sided spicate inflorescences; the calyx is growing in fruit to 8–12 mm long, with lobes becoming narrowly linear (fig. CD.72).

Arnebia linearifolia DC. BM 1670, BM 3258, BM 3359. This plant is very similar to *A. decumbens* but differs in the longer, broader, fruiting calyx lobes, which are 15–30 mm long and 3–5 mm broad at the middle.

Arnebia hispidissima (Lehm.) DC. BM 1460, BM 3073, BM 3182. This roughly hispid ascending or erect annual sometimes appears to perennate. Its lower leaves are linear-oblanceolate and up to about 4.5 cm long. The flowers are in one-sided inflorescences with yellow, pubescent corollas and calyces 5–7 mm long, not or hardly growing in fruit (fig. CD.73).

Arnebia tinctoria Forssk. BM 557, BM 1319, BM 1707. This dwarfish annual, usually branching from its base and 5–10 cm high, differs from the other *Arnebia* species by its pale violet or pinkish rather than yellow flowers. Its lower leaves are linear-oblanceolate or linear-oblong and about 3.5 cm long.

Echium horridum Batt. BM 601, BM 1502, BM 1548. An erect, usually branched hispid annual, this *Echium* has basal leaves sometimes rosetted, with broad-based white bristles, linear-oblong to spathulate, and to about 15 cm long. The flowers are in helicoid cymes and are red to purplish, darkening with age; the showy corollas are trumpet shaped, 15–25(30) mm long, with oblique open mouths. The taproot stains red, like the roots of the *Arnebia* species (figs. CD.157, CD.158).

karrāth, kurrāth (Muṭayr, northern tribes). Variants: ***kurrēth, kirrēth.*** Consultants of Āl Murrah, Qaḥṭān, and Āl Rāshid also used ***baṣal,*** the name for the cultivated onion, for this plant.

Allium sphaerocephalum L. Liliaceae. BM 1058, BM 1788, 8634. This wild onion has an erect scape 30–110 cm high; it has pale green leaves that are linear and involute channeled above, often somewhat pendulous and lying on the ground. The inflorescence is a dense, globose umbel, 3–5 cm in diameter, with purple

to pinkish flowers. The flower parts are used as a spice in food (fig. CD.56).

khafsh (Shammar, Qaḥṭān; also Ruwalah per Musil 1927, 601). Synonym: ***khinnēz*** (Qaḥṭān), from root *kh n z,* "to stink," referring to this coarse crucifer's somewhat unpleasant smell.

Diplotaxis harra (Forssk.) Boiss. Cruciferae. BM 1243, BM 1313, BM 1673. This erect pubescent annual, sometimes perennating, grows to 10–50 cm high. The dentate, ovate to oblong-lanceolate leaves are mostly basal. The flowers are yellow with petals 7–10 mm long. The fruits are 20–40 mm long and about 2 mm broad, erect spreading, and at length somewhat pendulous, on pedicels 5–15 mm long. A Shammarī consultant applied this name also to *Brassica tournefortii* Gouan (q.v. under ***ḥrēshā***) (figs. CD.148, CD.149).

khāfūr (Ruwalah, as per Musil 1927, 601; 1928b, 344). Synonym: ***ṣmēmā*** (q.v. for *Cutandia memphitca*), from consultants of Al Murrah, Banī Hājir, Qaḥṭān, Banī Khālid, Shammar. Musil gave the name ***khāfūr*** also for *Schismus arabicus*. That and *Sch. barbatus,* however, are virtually indistinguishable in the field, and *barbatus* seems to be the more common form.

Schismus barbatus (L.) Thell. Gramineae. K 96, BM 1603, BM 3102. This tufted annual grass, often dwarfed, has several to numerous prostrate or ascending culms, usually 5–15 cm high. The leaf blades are usually involute and 2–5 cm long. The flowering panicles are terminal, ovate-oblong in outline, and mostly 1–3 cm long; they may be contracted or somewhat loose and are sometimes lobed. The spikelets are green or purplish, 4–5 mm long, and with white-margined glumes. This plant is grazed by livestock in spring. The species occurs widely in Arizona deserts and other western American arid lands as an intrusive exotic sometimes called "Mediterranean grass" or "Arabian grass." In Arizona, my horse (who happens to be an Arabian) is very fond of grazing on it in the spring (fig. CD.301).

Schismus arabicus Nees. BM 1320, BM 1708, BM 2801. This plant is very similar to *S. barbatus* and is possibly conspecific with it, differing only in some near-microscopic details of spikelet anatomy. It, too, is a spring grazing plant.

khifjī (Qaḥṭān), *Centaurium spicatum* (L.) Fritsch. Gentianaceae. BM 1088, BM 1915, 7771. This centaury is an erect, glabrous herb 20–50 cm high, with stem leaves lanceolate and entire, 15–30 mm long but smaller above. The flowers are in terminal spicate racemes up to about 15 cm long, with corollas pink or white and 9–12 mm long. The fruit is a terete capsule 6–8 mm long, tapering at the apex, and shining brown. The plant is found only as a weed of oasis cultivation, but one of my elder Bedouin consultants knew it.

khubbēz (gen.). From ***khubz,*** "bread," referring to the flattened, disclike fruits resembling round loaves of Arab bread. Synonym: ***ṭubbāg*** (Banī Hājir), comparable to classical *ṭabag,* "cover, round tray, large dish," all descriptive of the fruit form.

Malva parviflora L. Malvaceae. BM 1341, BM 3163, BM 7423. This ascending annual, 4–40 cm high, has orbicular or reniform leaves that are crenate-dentate, 2–8 cm across, and nearly entire or palmately lobed. The flowers may be few or densely clustered, with petals white to pink or bluish; the calyx is broadly flattened at the base, supporting the carpels in a disclike fruit. The plant is generally found only on disturbed ground but is not uncommon around old desert campsites (fig. CD.233).

khushshēn (Muṭayr). From ***khashin,*** "rough, harsh (to the touch)," thus "roughwort," referring to this herb's stiff, rough feel. Musil attributed the singular form ***khushshēnah*** to *Carrichtera annua* (1927, 603). It, too, is rough to the touch. Violet Dickson gave the name ***nafagh*** (perhaps ***nafakh****?*) for *Carrichtera* in the Kuwait area (1955, 30).

Neotorularia torulosa (Desf.) Hedge et J. Léonard. Cruciferae. BM 1345, BM 1562, BM 7552. This rather rigid annual is 5–25 cm high and finely hirsute with erect white hairs. The basal leaves are rosulate in young plants, oblong and sinuate or pinnately lobed, but often absent in older plants. The stem leaves are linear, sinuate-dentate or nearly entire; the flowers are white, with petals 2–3 mm long. The fruits are siliques in elongated rigid racemes, terete, 12–25 mm long, and less than 1 mm wide, usually spirally coiled.

Carrichtera annua (L.) DC. Cruciferae. BM 604, BM 1547, BM 1576. This ascending annual, 5–30 cm high, is hispid with stiff, straight, white hairs. The leaves are 2–4 cm long and pinnately

divided into narrow, linear lobes. The flowers are in terminal racemes with cream to yellowish petals that are veined purple or brownish and are 5–8 mm long. The fruits are 6–8 mm long on deflexed pedicels and consist of an ovoid body with a flat, tonguelike appendage (figs. CD.109, CD.110).

khzāmā (gen.), *Horwoodia dicksoniae* Turrill. Cruciferae. BM 78, BM 1173, BM 3159. *Horwoodia* is a decumbent to ascending annual, 8–40 cm high, with young parts densely hirsute. Its leaves are ovate to oblong and coarsely serrate or pinnately lobed. The flowers are in terminal racemes with mauve-purple to violet petals about 15 mm long. The fruits are orbicular silicles, 12–20 mm across, glabrous and glossy when mature and strongly compressed, with a medial keel. The flowers are strongly and sweetly fragrant and often scent the milk of camels feeding on it (figs. CD.210–12).

kitāʻah (Muṭayr). Violet Dickson reported the synonym ***sibsab*** from the general vicinity of Kuwait (1955, 60).

Limonium thouinii (Viv.) O. Kuntze. Plumbaginaceae. 3879, 3905, 7527. This annual is glabrous but dotted with minute white excretions; it grows 10–25 cm high with several stems from a basal rosette of leaves, the upper stems having distinctive veined wings. The leaves are oblanceolate to spathulate, usually with three to four pairs of rounded lobes, and grow to 8 cm long. The flowers are in terminal helicoid cymes with branches below the flowers expanded into leaflike wings. The corollas are cream yellow but are soon deciduous, leaving the blue to white persistent, papery calyces (fig. CD.226).

krāʻ al-ghurāb (Banī Hājir). From ***krāʻ,*** "shank," + ***al-ghurāb,*** "the crow, raven," thus "crow's shank." Synonyms include: ***rijlat al-ghurāb*** (Ruwalah; Musil 1927, 619), from ***rijlah,*** "foot," + ***al-ghurāb,*** "crow," thus "crow's foot"; ***zumlūg*** (Banī Hājir, but see entry ***zumlūg*** at the end of this list); ***shakhīṣ*** (Shammar); ***jirjīr*** (Shammar; Musil 1928b, 343).

Senecio glaucus L. subsp. *coronopifolius* (Maire) Alexander. Compositae. BM 1210, BM 1506, BM 1545. This *Senecio* is an ascending, glabrous, branched annual 10–25 cm high. The leaves are somewhat succulent, pinnatisect into linear lobes or rarely entire. The richly golden heads are 1.5–2 cm across; the achenes are cylindrical,

indistinctly ribbed, dark brown, and 1.5–2 mm long with a caducous pappus of white hairs. This edible plant is consumed uncooked (fig. CD.306).

liḥyat at-tēs (Qaḥṭān, Ruwalah). From ***liḥyah,*** "beard," + ***at-tēs,*** "the male goat," thus "goat's beard." A consultant of Āl Murrah used the synonym ***liḥyat ash-shēbah,*** from ***liḥyah,*** "beard," + ***ash-shēbah,*** "the old man," thus "old man's beard." Another synonym is ***dhignūn*** (Shammar), comparable to *dhiqan,* "beard."

Koelpinia linearis Pall. Compositae. BM 1290, BM 1510, BM 1654. This ascending or decumbent diffuse annual branches from the base and is 10–30 cm high. The leaves are very narrowly linear and 5–15 cm long; the flowering heads are peduncled in the axils with rather few yellow florets. The fruits are conspicuous, stellate-spreading achenes, 15–20 mm long, narrowly cylindrical and with rows of hooked prickles at their backs. The plant is edible and generally eaten raw (fig. CD.217).

maknān (Āl Murrah). A Shammarī gave the name ***ḥalōlā*** for this plant.

Reichardia tingitana (L.) Roth. Compositae. BM 1270, BM 1542, BM 1587. *Reichardia* is a decumbent or short-ascending glabrescent annual with stems 5–25 cm long. The leaves are mostly rosulate, oblong to oblanceolate in outline, nearly entire or pinnatifid with dentate lobes. The heads are mostly solitary, the flowers yellow but with the ligules reddish purple on their backs. The achenes are rugose tubercled and four sided with rounded angles (figs. CD.271, CD.272).

marār (Āl Murrah, Banī Hājir). From ***murr,*** "bitter," referring to the bitterness this plant is said to impart to the milk of camels that graze on it. A Qaḥṭānī consultant voweled the name quite clearly as ***murār.*** Violet Dickson applied the name also to *Launaea angustifolia,* listed here (1955, 58).

Centaurea pseudosinaica Czerep. Compositae. K 554, BM 1775, BM 3912. This annual thistle, 10–35 cm high, is ascending and shortly pubescent, with stems and branches narrowly winged with decurrent leaves. Its leaves are oblong-linear in outline, the lowest dentate and more or less pinnatifid with oblong segments; those above are linear-oblong to lanceolate. The heads are terminal with yellow florets and are 5–15 mm wide (excluding the spines).

The involucral bracts terminate in yellow spines. The achenes have a pappus of fine bristles in several rows. This plant is said to be much liked by camels but avoided by herdsmen because it taints the milk with a bitter taste (figs. CD.115, CD.116).

Launaea angustifolia (Desf.) O. Kuntze. Compositae. BM 1398, BM 3338, 7911. This annual is ascending, glabrous, usually branched above, and 10–30 cm high. Its lower leaves are mostly 3–6 cm long and variably incised-dentate; the upper stem leaves are smaller and clasping with auricles. The heads are mostly terminal at the stem apices and when open are yellow and up to 4 cm across. The achenes are about 3 cm long, quadrangular, each bearing a dense, snow white pappus of hairs 4–5 mm long. The stems contain a milky juice, which might account for its being given a name associated with bitterness (fig. CD.219).

millēḥ (gen.). From ***milḥ,*** "salt," thus "saltwort."

Aizoon hispanicum L. Aizoaceae. BM 356, BM 1370, BM 1528. This papillose-succulent, branched annual grows 5–15 cm high and has opposite or subopposite leaves that are oblong-lanceolate to linear and up to about 3 cm long. The flowers are apetalous, greenish outside and whitish within; the perianth is 11–16 mm long with lanceolate lobes much exceeding the tube. The capsule is somewhat flattened at the apex. This plant is one of the very few annuals that are assigned to the intermediate category ***ḥamḍ*** (fig. CD.53).

nafal (gen.). A consultant of the Shammar tribe used the name ***shmaṭrī*** in an equivalent sense. The generic refers to two species of *Trigonella* (Leguminosae), with a focus on the aromatic *T. stellata.*

Trigonella stellata Forssk. BM 565, BM 1256, BM 1824. This *Trigonella* is a glabrescent prostrate annual with stems up to about 35 cm long. Its leaves are trifoliolate with leaflets obovate to obcordate, dentate above, and 4–12 mm long. The flowers are clustered, 3–4 mm long, with yellow corollas; the pods are stellate spreading, curved, and 4–8 mm long. The plant overall is aromatic, with a sweet, clean smell; Bedouins have used it as a hair dressing.

Trigonella anguina Del. BM 1584, BM 7417, 8080. This plant is another prostrate, glabrescent annual with trifoliolate leaves; the leaflets are obovate or rounded-cuneate, serrate, and 5–9 mm long. The flowers are clustered in the axils, 3–4 mm long, with yellow

corollas slightly exceeding the calyces. The pods are sessile and clustered, to about 8 mm long, and strongly zigzag wavy or folded from side to side. The pods' form is very distinctive; they resemble small, wavy, wriggling worms or snakes.

ragam (gen., at least among northern tribes). This generic is applied to several procumbent or decumbent annual species of *Erodium* (Geraniaceae) with a focus on *E. deserti* and *E. laciniatum*. Banī Hājir (and possibly other more southern tribes) appear to prefer the synonym ***garnuwah,*** from ***garn,*** "horn," referring to the horn-like beaks on the fruits. The name ***kirsh,*** meaning "paunch, rumen (of livestock)," was given on at least one occasion by a consultant of Āl Murrah for *Erodium laciniatum,* possibly through confusion with *Erodium glaucophyllum* (see ***kirsh***).

Erodium deserti (Eig) Eig. BM 588, BM 1559, BM 2190. This annual cranesbill is procumbent or decumbent and pubescent, with stems to about 30 cm long. Its leaves are oblong in outline, 2–8 cm long, and mono- or bipinnatisect with incised segments. The pink-mauve flowers grow three to ten together in umbels on long peduncles. The fruit beaks are 25–35 mm long, and the achenes have two pits at the apex with a concentric furrow below each (figs. CD.166, CD.167).

Erodium laciniatum (Cav.) Willd. BM 536, BM 1436, BM 1830. This plant is another annual cranesbill; it may be procumbent or ascending in habit and is grayish green, shortly pubescent, and with stems to 30 cm long. The leaves are ovate in outline and 2–4 cm long; they are quite variable in lobation: from dentate to pinnately divided nearly to the base, but often with three to five main lobes. The flowers are umbelled and pink or, rarely, white; the fruit beaks are 30–40 mm long, and the achenes have two pits at the apex, without furrows (fig. CD.170).

Erodium ciconium (L.) L'Hér. BM 1344, 4039. Violet Dickson reported that the name ***ragam*** is also used in the Kuwait hinterland for this plant (1955, 40). This species is also found in our area and is readily recognizable by its very stout fruit beaks. Its leaves are ovate-oblong in outline and mono- or bipinnatisect. The flowers are pink to violet, the sepals growing markedly in fruit to 12–15 mm long. The fruit beaks are very stout and 5–11 cm long.

rghēlah (northern tribes; Musil 1927, 619). Diminutive of ***rughl,*** the widely used name for the perennial *Atriplex leucoclada,* thus "little ***rughl.***"

Atriplex dimorphostegia Kar. et Kir. Chenopodiaceae. BM 622, BM 1447, 7835. This whitish-canescent branched annual is 10–25 cm high. The leaves are 2.5–6 cm long, deltoid or rhomboid to ovate-elliptical in outline, and silvery with shining crystalline papillae when fresh. The flowers are in both axillary clusters and short terminal spikes; the obscurely denticulate fruiting valves are broadly cordate, reticulately nerved, and about 8 mm broad. This plant is one of the very few annuals considered to belong to the intermediate category ***hamḍ*** (fig. CD.91).

ribl (gen.). A consultant of Āl Murrah used the synonym ***yanam*** for this and at least one other species of *Plantago*.

Plantago boissieri Hausskn. et Bornm. Plantaginaceae. BM 1416, BM 1646, BM 1777. This ascending, villous annual is usually stemless and 10–30 cm high. The leaves are rosulate, linear-lanceolate, and 5–15 cm long. The flowers are in cylindrical spikes 2–12(20) cm long and 3–5 mm wide; the sepals are oblong, scarious margined, and ciliate at the apex; the corolla lobes are ovate-oblong and glabrous. The capsule is enclosed in the calyx, ovoid-globular and scarious, and 2–2.5 mm long. This species is a very important and widespread spring grazing plant in sandy terrain, often probably accounting for a major portion of the total seasonal biomass (figs. CD.261, CD.262).

rubaḥlah (gen.)

Scorzonera papposa DC. Compositae. BM 1276, BM 1400, BM 1614. This ascending, showy-flowered perennial herb grows to 15–50 cm high with branched stems; it has a dark brown tuber on the root. The leaves are elliptical-oblanceolate, entire or erose, often wavy margined, and 5–10 cm long. The heads are solitary, terminal, 4–5 cm wide in flower, with showy pink to purplish florets. The achenes are 8–10 mm long, grooved-muricate, and with a white pappus 10–13 mm long. This species is one of the best-known edible plants; the Brazil nut–like tuber is the part used, eaten raw (fig. CD.303).

sa'dān (gen.). Cf. classical *sa'dānah,* "knot, camel's callosity, areola of the nipple," all resembling this plant's peculiar discoid fruit.

Neurada procumbens L. Rosaceae. BM 1262, BM 3129, BM 3154. *Neurada* is a prostrate, gray-green tomentose annual with several branches from the base. It has ovate-lanceolate leaves that are unequally and pinnately lobed, with raised nerves on the lower face. The inconspicuous flowers are in the upper axils and have five cream, greenish, or pinkish petals and ten stamens. The distinctive fruit is flat, discoid, and 12–18 mm in diameter; it becomes hard and woody in maturity and is smooth below but furnished with prickles above. The prickly fruits are effective dispersal units, clinging equally well to the feet of animals, the shoes of man, and the tires of automobiles. This plant is very widely known, and the name is very stable (figs. CD.243, CD.244).

salīḥ (gen. north). This generic is sometimes heard vocalized ***islīḥ,*** which corresponds to classical spelling. A consultant of Banī Hājir once offered the name ***zumlūg*** (q.v.) for *Cakile*. The name ***salīḥ*** may be applied to at least three different red- or purple-flowered annual crucifers of large, spreading stature or (as with *Malcolmia*) with particularly showy flowers. I also have record of a doubtful attribution of this name to *Gypsophila antari* Post et Beauv., a rather different-looking plant, by a consultant of the Ruwalah tribe.

Cakile arabica Vel. et Bornm. Cruciferae. BM 1184, BM 1810, BM 3173. This *Cakile* is an ascending, branched, somewhat succulent glabrescent herb to 50 cm high. The lower leaves are pinnately divided into narrowly linear lobes; the flowers are purple with petals 8–10 mm long. The fruits are spreading in elongated loose racemes, with two joints, and are 10–20 mm long and 2–3 mm wide; the distal joint is compressed, tapering to a flattened apex (figs. CD.96, CD.97).

According to Violet Dickson, this name is also used for the following two plants (1955, 40, 65), both red-flowered crucifers:

Erucaria hispanica (L.) Druce. Cruciferae. K 608, BM 4024, BM 4046. This plant is also an erect, glabrous, branched annual and sometimes is up to 75 cm high. The leaves are succulent and bipinnatisect with linear lobes. The flowers have purple to white, finely veined petals 10–14 mm long; the fruits are 10–17 mm long and 1.5–2 mm wide, spreading or somewhat appressed and terminating in a beaklike filiform style 3–4 mm long (fig. CD.171).

Malcolmia grandiflora (Bge.) O. Kuntze. Cruciferae. BM 2860, BM 3353, BM 3323. This rather showy annual grows erect, sometimes branched from the base, and is 10–40 cm high. The leaves are mostly in a basal rosette, oblong to oblanceolate, sinuate to dentate, tapering at the base to a petiole. The flowers are 8–15 mm long, with the petals more than twice as long as the sepals. The petals are pink to purple with some darker veins. The siliques are 20–60 mm long and about 1 mm wide, spreading-ascending, and straight or semicoiled near the apex (fig. CD.232).

ṣam'ā (gen.). Cf. *ṣam'ā'* (fem. sing. adj.), "slender, sharp," thus "sharp grass."

Stipa capensis Thunb. Gramineae. K 101, BM 1399, BM 1876. This tufted annual grass has numerous culms that are kneed at the base, then erect; it grows to 15–45 cm high. The leaf blades, mostly 4–10 cm long, are very narrow and convolute. The flowering panicle is terminal, erect, and 8–30 cm long; the spikelets are acuminate and 15–20 mm long, with an awn 6–13 cm long that is twisted and short-pubescent in its lower half. This grass is considered good grazing when young, but when it is mature, the hardening awns may penetrate the mouth parts of livestock (figs. CD.310, CD.311).

samḥ (gen. north). This generic in northern Arabia includes the three aizoaceous plants used as sources for the edible seeds (also usually called ***samḥ***) that have long been an important wild food gathered by several northwestern tribes. The focus of the name is on the most important of these three plants, *Mesembryanthemum forsskalei,* which is assumed to be referred to in the absence of qualifying information. As a generic, ***samḥ*** includes three folk specifics discussed in section 5.3.5:

Generic: ***samḥ***

Specifics:

samḥ, samḥ ḥurr, from ***samḥ*** + ***ḥurr,*** "pure, genuine," thus "genuine, true ***samḥ.***" When used in the context of discussions about "types of ***samḥ,***" the ***"samḥ"*** part of the name is assumed, and it becomes simply ***ḥurr*** or ***al-ḥurr,*** "the true or genuine one."

Mesembryanthemum forsskalei (Hochst.) N. E. Br. 3764A. This papillose, very succulent herb grows erect or ascending with stems 10–25 cm high. The leaves are conical, subterete,

and decurrent above, to about 5 cm long and 1.5 cm thick. The flowers are axillary, with a calyx of unequal lobes and petals white to cream, yellowish at the base, exceeding the calyx at anthesis. The capsule is 12–15 mm long. The plant provides edible seeds (figs. CD.237, CD.238).

ḥamar wāgif (Shammar), from ***ḥamar,*** “red,” + ***wāgif,*** “standing,” thus “standing red,” referring to this plant’s erect or ascending habit and red color (and thus differentiating it from its fellow specific *Aizoon canariense,* which is procumbent and green).

Mesembryanthemum nodiflorum L. BM 2893, 3781, 7523. This species is an ascending, succulent, papillose herb, often becoming reddish, also branching from the base and growing to 5–20 cm high. The leaves are teretish linear, to about 3 cm long, and more or less ciliate at the base. The flowers are axillary, each with twenty to thirty petals (technically staminodes) that are subfiliform, white to cream and yellowish near the base, all within a succulent calyx with lobes unequal and 6–10 mm long. The capsule is 5–8 mm long and somewhat pentagonal-pyramidal at apex. The plant provides edible seeds (fig. CD.239).

daʿāʿ, *Aizoon canariense* L. BM 1208, BM 1751, BM 3165. Some informants, particularly in areas where ***samḥ*** seeds are not collected or used, applied the name ***daʿāʿ*** also to *Mesembryanthemum nodiflorum. A. canariense* is a procumbent, pubescent-papillose herb with stems branching radially from the base, rather stiff and often zigzag, to about 15 cm long. The leaves are alternate, spathulate to oblong-obovate, and mostly 1–2 cm long. The apetalous flowers are greenish outside and yellowish within, with a perianth 3–5 mm long of triangular lobes. The capsule is flattish and star shaped at the apex. The species provides edible seeds (fig. CD.52).

samnah (Shammar). From ***samn,*** “clarified butter,” perhaps referring to the flowers’ yellow color.

Carthamus oxyacantha M.B. Compositae. BM 644, 7847, 8304. This ascending, much-branched, coarse prickly herb has whitish stems and is 30–100 cm high. The leaves are coriaceous, oblong to lanceolate, partly clasping at the base, dentate, and with yellow spines 2.5–5.5 cm long. The heads are solitary and terminal

with yellow florets; they are exceeded by the spiny outer involucral bracts. This weedy plant is usually found on disturbed ground.

shaḥḥūm (Ruwalah). Musil recorded this name from northwestern Arabia (1928a, 95, 706), but I have not found it used in the east. It is apparently related to ***shaḥm,*** "fat" (of meat), and thus might be glossed something like "fatwort," conceivably because of its thick, rounded bulb.

Gagea reticulata (Pall.) Schult. et Schult. f. Liliaceae. BM 1176, BM 1333, 8749. This small but rather showy dwarf lily, 4–11 cm high, is usually found growing among rocks. The leaves are narrowly linear to filiform, arising from a bulb 1–1.5 cm long with reticulate, fibrous coats. The two to four flowers are 8–10 mm long with a bright yellow perianth, sometimes greenish yellow within. The fruit is an oblong capsule 10–12 mm long (figs. CD.181, CD.182).

sha'īr (gen.). Probably related to ***sha'r,*** "hair," with reference to the awns on this plant's spikelets.

Hordeum vulgare L. Gramineae. BM 1727, 3749, 8252. This cultivated barley is a stout annual grass with culms to about 90 cm high. The leaf blades are flat, tapering to their apices, with small auricles at the base. The dense, flowering spike is oblong-lanceolate, 6–10 cm long (excluding the awns), with two or six rows of fertile spikelets; the prominent awns are 12–15 cm long. Both six-rowed and two-rowed forms of barley (the latter *Hordeum distichon* L.) have been noted in our study area. Cultivated barley is known to all Bedouins; the grain is sometimes purchased for livestock feeding, and the plant sometimes escapes from grain spilled along roadsides after rains. With respect to the life form of this generic, see remarks under ***ḥinṭah*** (given earlier), which also apply here.

shgārā (Āl Murrah, gen.). This name is related to ***shagrā*** (fem.), "reddish or blond," perhaps in reference to the plant's reddish flowers. The generic applies to two species of *Matthiola* (Cruciferae). Musil recorded the name ***ḥimḥim*** for these plants among the Ruwalah of northern Arabia (1927, 604). Classical Arabic written sources indicate that *ḥimḥim* was synonymous with *khimkhim* and that the plant thus named resembles (if it is not identical with) *shuqārá* (Lewin 1953, 125–26). *Shuqārá* was also said to give a pungent

odor to the milk of camels that ate it (Hamidullah 1973, 69, which gives the form *shuqqārá*), and a consultant of Āl Murrah told me that it is ***khimkhim*** that gives the strongest smell to camels' milk. He may have used this synonym rather than the more common name, ***shgārā,*** because he had in mind a folk poetic source.

Matthiola longipetala (Vent.) DC. BM 556, BM 1553, BM 3322. This erect or ascending annual is gray tomentose with stellate pubescence and 8–40 cm high. The lower leaves are pinnately lobed with obtusish, oblong-triangular segments; the upper leaves are narrower. The flowers are 15–20 mm long, with undulate petals that are purple and often tinged yellowish or greenish. The terete fruits, 4–6 cm long, have two prominent curved horns at their apex when mature (figs. CD.234, CD.235).

Matthiola arabica Boiss. BM 426, BM 1448, BM 1807. This species is rather similar to *M. longipetala* but is identifiable by its entire lower leaves and hornless fruits.

sh/hēbā (Shammar). Diminutive of ***shahbā*** (fem.), "light gray," referring to this plant's conspicuous, silvery white, scarious stipules and bracts. Two synonyms recorded by Musil in northern Arabia are ***bwēḏā*** (1927, 594), diminutive of ***bēḏā*** (fem.), "white," thus "little whitewort," and ***shidd al-jamal*** (1927, 623). A Shammarī consultant pointed out that the name ***sh/hēbā*** is used among his people for two plants: *Paronychia arabica* and the chenopod *Bassia muricata* (which he named from a specimen).

Paronychia arabica (L) DC. Caryophyllaceae. BM 1268, BM 1778, BM 7426. *Paronychia* is a prostrate annual with puberulent stems, sometimes tinged reddish and to about 30 cm long. The leaves are sessile, narrowly oblanceolate or elliptical to linear, and 4–13 mm long; the conspicuous stipules are silvery white. The flowers are only 1.5 mm long and hidden in bracts.

shi'ēyirah (aẓ-Ẓafīr). Diminutive of ***sha'īr,*** "barley," thus "little barley," perhaps referring to the plant's inflorescence, which somewhat resembles a head of barley. Musil recorded the name ***sijīl*** for this species in northern Arabia (1927, 624).

Rostraria pumila (Desf.) Tzvelev. Gramineae. BM 1160, BM 1385, BM 3277. This annual grass has single to densely tufted culms, is ascending to erect, and 5–40 cm high. The leaf blades are

2–9 cm long, and the softly awned spikelets are in a dense, spike-like panicle, lanceolate in outline and sometimes lobed, 1.5–4(8) cm long. *Rostraria pumila* is a useful and sometimes locally abundant spring grazing plant (figs. CD.4, CD.280).

shilwah (Ruwalah). Musil recorded this name for *Linaria ascalonica* Boiss. et Kotschy, a taxonomic synonym for our species (1927, 624). Violet Dickson noted the name ***umm as-suwēg*** or ***suwēk,*** which she wrote "Um as Suaich," in Kuwait for what was probably the same plant (1955, 61).

Linaria tenuis (Viv.) Spreng. Scrophulariaceae. BM 1180, BM 1803, BM 3728. This *Linaria* is an erect annual, mostly glabrous and 10–30 cm high. The stem leaves are linear-filiform and 1–3 cm long; those on sterile shoots are wider. The flowers are racemed and rather distant, with the yellow corolla 7–9 mm long including the spur, which is descending and nearly straight. The fruit is an oblong-cylindrical capsule that equals or exceeds the calyx.

shirshir (gen.). Cf. classical *sharshara,* "to cut a thing, to sharpen," in possible reference to this plant's sharp, prickly nature (but the verb possibly derives from the plant). The variant and synonyms ***sharshshīr, ḏrēsah*** (diminutive of ***ḏirs,*** "tooth," thus "little tooth"), and ***gaṭb*** were heard from a Ruwalah consultant.

Tribulus terrestris L. Zygophyllaceae. BM 599, BM 1862, BM 3151. This weedy *Tribulus* is a prostrate annual with stems spreading from the base and up to 100 cm long. The leaves are 2–4 cm long with four to seven pairs of leaflets; the leaflets are oblong, appressed pubescent below, and 4–8 mm long. The solitary flowers have yellow petals 4–6 mm long. The fruits are globose, 5–7 mm in diameter, with a pair of diverging spines, 3–6 mm long, on each carpel. The plant is usually found as a weed around settled areas but is also seen on disturbed ground around Bedouin campsites.

shōlah (Qaḥṭān). From the root *sh w l,* which connotes the idea of an "upraised, curved tail," such as the tail of a scorpion, referring to this plant's tail-like spicate inflorescence (and to most others of the family Resedaceae). A Shammarī consultant offered the synonym ***dhanabnāb*** (a variant of ***dhanabān,*** from ***dhanab,*** "tail," + ***-ān,*** denoting resemblance, thus "tail-like plant"). Both of these names have also been recorded for the perennial *Reseda muricata*.

Caylusea hexagyna (Forssk.) M. L. Green. Resedaceae. BM 587, BM 3099, 8626. *Caylusea* is a papillose to pubescent ascending annual herb, 20–50 cm high, sometimes perennating and usually with several stems coming from the base. The entire leaves are narrowly oblong to lanceolate, 1–5 cm long, and wavy at their margins. The flowers, with white petals and ten to fifteen stamens, are in dense terminal racemes that elongate in fruit. The ovary is stipitate, with six teeth and gaping when ripe, showing a woolly mouth (fig. CD.113).

ṣiffār (gen.). An intensive from ***aṣfar,*** fem. ***ṣafrā,*** "yellow," referring to this plant's strongly yellow flowers. A Shammarī informant gave the variant ***ṣifār.***

Schimpera arabica Hochst. et Steud. Cruciferae. BM 1302, BM 1331, BM 1486. This erect annual, often with a branching stem from a rosette of leaves, is 3–30 cm high. The basal leaves are lanceolate-spathulate and runcinate-dentate or pinnatifid; the stem leaves are oblong-linear and nearly entire. The yellow-petalled flowers are in dense terminal racemes that elongate in fruit. The fruit is ovoid, appressed to the stem, with one seed and a 3–8 mm long compressed beak diverging from the fruit body. This well-known edible plant is eaten raw for its mustardy flavor (figs. 3.3, CD.9, CD.10, CD.300).

ṣmēmā (Āl Murrah) Cf. root *ṣ m m,* associated with the idea of "hardness" as well as of "deafness." The name here is the diminutive of ***ṣammā*** (fem.), "hard," thus "hard grass," which fits *Cutandia*—with its stiff, hard spikelets—very well. A consultant of Banī Hājir applied it also to *Stipa capensis,* which has awns that grow hard. A synonym from a Shammarī informant was ***ẓarrīʻ.*** The generic ***ṣmēmā*** is applied to at least three species of low, annual grasses, with a focus on *Cutandia,* which has a hard, stiff inflorescence. Violet Dickson recorded the name ***thēyyil*** (as "Atheyil") for *Cutandia memphitica;* I got that name as a synonym for *Cynodon dactylon*. I recorded the name ***ṣmēmā*** on several occasions also for two species of *Schismus* (q.v. under ***khāfūr***). Like *Cutandia,* those species are common, small annual grasses. In general, I found the Bedouins' folk nomenclature of annual grasses to be rather loose and variable, as if consultants did not know them well or rarely paid attention to them.

Cutandia memphitica (Spreng.) Benth. Gramineae. K 100, BM 1254, BM 1342. This low, ascending or decumbent annual grass, 10–20 cm high, is sometimes flushed purplish. The distinctive inflorescence consists of richly and dichotomously branched, elongated, stiff, zigzagged panicles. The spikelets are 7–9 mm long. *C. memphitica* is a good spring grazing grass when green and young (fig. CD.133).

tarbah, turbah (Āl Murrah, Banī Hājir). This generic is a feminine noun form from ***tarb, trāb,*** "earth, soil," referring to the sand or soil particles always seen adherent to these two plants, which are very different in appearance apart from their tendency to collect sand particles on their surfaces. A synonym for *Silene* in northern Arabia is ***ballah*** (Shammar, Ruwalah), from the root *b l l,* "to be wet," also referring to the plant's viscid surfaces. Musil recorded ***ẕnēmah*** for *Ifloga* among the Ruwalah (1927, 631).

Silene villosa Forssk. Caryophyllaceae. BM 538, BM 1795, BM 1818. This rather showy *Silene* is a glandular-pubescent ascending branched annual, 10–30 cm high, viscid, and often with adherent sand. The leaves are oblong-oblanceolate and 2–4 cm long. The flowers have white to very pale pink corollas; the petal limbs have two parts or are divided with obtuse lobes (figs. CD.7, CD.307).

Ifloga spicata (Forssk.) Sch.-Bip. Compositae. BM 1152, BM 1638, BM 1791. This distinctive dwarf annual grows 3–12 cm high; it is viscid and often coated with adherent sand. The leaves are dense, very fine linear-subulate and mostly 10–15 mm long. The ovoid heads are clustered one to three in the axils and are about 3 mm long with golden yellow, ovate involucral bracts (fig. CD.216).

ṭīṭ (gen.) Cf. classical *ṭīṭ, ṭīṭān,* clearly also applied to a wild onion.

Allium sindjarense Boiss. ex Hausskn. ex Regel. Liliaceae. 1272, 1354, 8755. This small wild onion of silty soils grows 8–20 cm high. There are usually three very narrowly linear leaves, only 1–2 mm wide. The bulb is oblong or ovoid, 2–3 cm long, with brownish, fibrous-reticulate tunics. The flowers are white or weakly pink, in an umbel with five to forty rays, each 1–3 cm long and terminating in a single flower (fig. CD.55).

tummēr (ar-Ruwalah; Musil 1927, 628).

Erodium bryoniifolium Boiss. Geraniaceae. BM 1594, BM 1690, 7956. This gray-green prostrate to decumbent annual has ovate-cordate leaves with three to five obscure lobes. The flowers have pink petals, and the sepals are 5 mm long, yellowish margined with three green nerves. The pinkish gray canescent fruit beaks are 5–8 cm long. Musil noted that this name is used in northern Arabia also for *E. ciconium* (L.) L'Hér. (see the entry ***ragam,*** given earlier).

umm ath-thrēb (Suhūl). From ***umm,*** "mother," + diminutive of ***thirb,*** classically meaning "fat of the intestines" (of a sheep, etc.). This name is applied to two rather similar species of *Hypecoum* (Fumariaceae). Essentially the same name, but with ***abū,*** "father," substituted for ***umm,*** "mother," was used by a Qaḥṭānī informant for *Frankenia pulverulenta* (see ***abū thrēb*** given earlier).

Hypecoum geslinii Coss. et Kral. BM 1442, BM 3872, BM 4027. This fine and somewhat delicate glabrous annual is ascending or decumbent in habit and 5–25 cm high. The leaves are mostly basal and rosulate, lanceolate-oblong in outline; they are 3–10 cm long and pinnatisect into linear to filiform lobes. The flowers are 5–7 mm long with four yellow petals. The fruits are cylindrical-linear and tapering at the apex, transversely jointed, and 2–3.5 cm long; they are often ascending from a reflexed pedicel (fig. CD.215).

Hypecoum pendulum L. BM 558, BM 3348, BM 4007. This plant is similar to *H. geslinii* but is identifiable by its pendulous (rather than erect, ascending) fruits and by the minute, purple-black flecking on the inner pair of petals.

'unṣēl (gen. north), *Gynandriris sisyrinchium* Parl. Iridaceae. 851, BM 1422. This wild iris is 10–30(50) cm high with erect stems arising from an ovoid corm with brown, fibrous tunics. The leaves, usually two, ascend from the base and are linear and channeled above. The flowers are 2–4 cm long and arise from papery spathes; they have a ground color of purple to purplish pink, faintly and radially veined darker; the falls are spathulate, with a white to yellowish central spot flecked below with purple. This flower is one of the showiest in the spring, sometimes growing in striking masses (figs. CD.185, 186).

'uwējimān (Qaḥṭān). This name is an interesting construction, apparently a "likening form" related to the root *' j m,* perhaps in its sense of "foreign"(and possibly a nonce response).

Chenopodium murale L. Chenopodiaceae. K 729, BM 1224, BM 3164. This erect annual, growing to about 40 cm high, is a weedy plant found around cultivation but also sometimes on the disturbed ground of Bedouin campsites. Its leaves are 1.5–8 cm long and broadly triangular, with coarsely toothed to incised margins. The small greenish flowers are in terminal and axillary clusters.

'uwēnah (gen.). Diminutive of ***'ēn,*** "eye," thus "little eye."

Anagallis arvensis L. Primulaceae. BM 2729 (var. *caerulea*), 7950 (var. *caerulea*), 8194 (var. *arvensis*). This glabrous, ascending annual is 5–20 cm high with quadrangular stems. The leaves are opposite or whorled, ovate to triangular-ovate, and 1.5–2 cm long. The flowers may be red (var. *arvensis*) or blue (var. *caerulea*) and are about 10 mm wide. The capsule is globose and 4–6 mm in diameter. The plant is usually found as a weed in agricultural land but also occurs on disturbed ground around Bedouin campsites and sometimes spontaneously in the desert. The red- and blue-flowered varieties may occur sometimes together (fig. CD.62).

wbērah (north, Musil 1927, 629). Diminutive from ***wabar,*** "fur, soft hair," referring to this plant's soft, hairy appearance.

Scabiosa olivieri Coult. Dipsacaceae. BM 1347, BM 1521, BM 1672. This scabious is an erect or ascending annual with both appressed and spreading hairs. The leaves are linear-oblong or oblanceolate and 1–5 cm long. The flowers are pink-lilac, pubescent, 5–10 mm long, and grouped in heads 4–10 mm in diameter. The corona of the involucel is membranous, about 2 mm long, with twenty to forty nerves; the inner calyx has fine, reddish purple awns 4–7 mm long (fig. CD.297).

yanam (Āl Murrah). Āl Murrah informants tend to use the name ***yanam*** for most desert species of *Plantago,* including *Plantago boissieri,* which is consistently called ***ribl*** by other tribes. Violet Dickson gave the synonym ***grēṭā*** (among northern tribes) for *P. ciliata* (1955, 75).

Plantago ciliata Desf. Plantaginaceae. BM 1287, BM 1351, BM 3066. This villous, short-stemmed or stemless annual grows to 3–7 cm high. The leaves are rosulate, obovate-spathulate to oblanceolate, and 1.5–5 cm long. The flowering spikes are ovoid

to oblong-short-cylindrical and 1–2 cm long. The flowering bracts are elliptical, villous, and white margined; the corolla lobes are villous at back. The fruit is a darkish brown obovoid capsule about 2.5 mm long (fig. CD.263).

Plantago psammophila Agnew et Chalabi-Ka'bi. BM 1286, BM 1379, BM 3067. This villous plant somewhat resembles *P. ciliata* but differs by its longer leaves (5–10 cm) and longer cylindrical spikes (2–7 cm). The corolla lobes are villous at their backs, and the capsule is ovoid-ellipsoid, dehiscing near the middle, and about 2.5 mm long.

zarrīʻ (Shammar). The root *z r ʻ* is strongly associated with the concepts "seeds" and "cultivation." Shammar informants appear to apply this name to a variety of annual grasses, including, in addition to the *Hordeum* listed here, *Cutandia memphitica, Polypogon monspeliensis,* and *Avena sativa* (the cultivated oat). A Qaḥṭānī consultant gave this name for *Polypogon monspeliensis*.

Hordeum murinum L. subsp. *glaucum* (Steud.) Tzvelev. Gramineae. K 595, BM 3089, BM 7420. This annual grass has culms that are ascending to erect and mostly 10–35 cm high. The leaf blades are flat, linear-acuminate, and 3–8 cm long. The flowering spike is linear-oblong and 3–7 cm long; the awns of the central spikelets are about 22–25 mm long, slightly exceeded by those of the acuminate lateral spikelets. This plant is weedy but is sometimes seen on apparently undisturbed desert in the northern parts of our study area (figs. CD.208, CD.209).

Polypogon monspeliensis (L.) Desf. Gramineae. K 179, BM 25, 8122. This glabrous annual grass grows to about 40 cm high. The panicles are solitary and terminal, very dense and spikelike, sometimes lobed, and 2–12 cm long. This species is weedy, usually seen only on disturbed ground around cultivation or on roadsides.

zumlūg, zamlūg (various tribes). This name was puzzling, heard occasionally from different tribal sources and applied to plants that were quite unrelated in appearance or in known use. A tribesman of aẓ-Ẓafīr (met in the field and of untested reliability) gave this name to *Anthemis melampodina,* a composite with white ray florets, which is otherwise generally called ***gaḥwīyān.*** A Banī Hājir informant gave the same name for the purple-flowered crucifer *Cakile arabica* (for which I give the name ***salīḥ***), and another Hājirī applied it to *Senecio glaucus,* a composite with bright yellow flowers. A boy

of unknown tribal connection in the vicinity of the Qaṭīf oasis gave the name ***zumlūg*** for the common sedge *Cyperus conglomeratus*. (His names for other plants in the vicinity fitted well with general Bedouin usage.) One of my Shammarī consultants told me that the word ***zumlūg*** can mean "any annual plant" and is thus a synonym, particularly in poetic context, for ***ʿishb.*** It seems probable that the name has basically this general sense, and speakers were simply throwing it out because they did not know the names of the plants being presented. In my experience, it was used when the referent had fairly showy flowers and is thus somewhat equivalent to the English folk category "flower" in the sense of "small green plant that bears flowers." I do not consider it a formal synonym for the life form ***ʿishb.***

zwān (Ruwalah; Musil 1927, 631), *Lolium rigidum* Gaud. Gramineae. BM 3060, K 8219, 8253. This glabrous annual grass has culms that are 30–60 cm high. The leaf blades are long tapering to the apex and 5–20 cm long. The flowering spike is 10–30 cm long, erect and more or less stiff, with spikelets appressed-ascending; the spikelets are awnless and 10–15 mm long. This plant is mainly a weed of cultivated areas, but it is occasionally seen on roadsides and on disturbed desert sites, probably seeded from spilled grain.

12. Unaffiliated generics (generics not considered to belong to any labeled life form):

nakhl (gen.). One would refer to a single date palm tree as a ***nakhlah*** (using the unitative singular form), but to a group of date palm trees or a date grove as ***nakhīl,*** an alternative plural form of this generic. A single staminate (male) palm tree may be referred to as a ***faḥl,*** "male, stud" (the same term used for a male camel or any other male animal). The pistillate (female) form (which is much more numerous in cultivation) is linguistically unmarked, being assumed in the term ***nakhlah.***

Phoenix dactylifera L. Palmae. The date palm is a dioecious palm maintained with a single trunk in cultivation but with multiple offshoots arising from the base in wild or feral form. In cultivation, it grows up to about 15 m high in the study area. The leaves are glaucous, spreading from a terminal crown, and mostly 3–5 m long,

with a woody midrib; the leaflets are numerous, induplicate, grading below into strong spines. The several inflorescences are richly paniculate. The flowers are sessile, the staminate ones about 8 mm long, with a calyx reduced to a short, three-toothed cup and with three petals. The pistillate flowers are about 5 mm long with three carpels slightly exserted. The fruit is the drupelike date, which is highly variable in shape, size, and color according to cultivar (figs. CD.256, CD.257).

The date palm is cultivated on a large scale in the major oases such as al-Ḥasā and al-Qaṭīf. It also occurs in wild form, for which Bedouins use the generic name ***ḥīsh*** in the coastal plain of our study area. Some of these uncultivated plants may be escapes from dropped seeds; others may be remnants of an original wild population (Mandaville 1990, 397–98). These wild palms, through natural wind pollination, produce "wild form" dates that are generally inferior to those of cultivated varieties. Bedouins sometimes collect such fruit, however, referring to them as ***wahalān,*** the sense of the word possibly related to one meaning of the classical root verb *wahila,* "to commit a mistake."

Bedouins do not consider the date palm a kind of ***shajar,*** or "shrub/tree/other perennial." It is rather a ***nōʿin lḥālhā,*** "a kind by itself." According to F. S. Vidal, the settled oasis folk also hold this view, never referring to a date palm as a ***shajarah*** (1955, 164–65), although that term is applied to other cultivated oasis plants of shrub or tree form. The fruit-bearing female date palms in cultivation are propagated by offshoots from mother plants, thus maintaining true varieties by cloning. Pollination is by hand, using sprigs of staminate flowers from the small number of male palms maintained for that purpose in the orchards.

Dates are one of the most important locally grown staple foods of the Bedouins, who are familiar with the tree even though virtually all of their fruit requirements are purchased from oasis cultivators. A few tribes, including Āl Murrah, have settled sections that own date palms in minor oases or irrigated gardens, maintained largely by hired farmers of non-Bedouin background. Dates are picked and eaten in three main stages of development: (1) the stage called ***bisr,*** when the fruit is still hard and of characteristic varietal

color, but crunchy and quite sweet, although the sugar has not yet inverted; (2) the stage called ***ruṭab,*** when the fruit is beginning to become fully ripe, parts of it (usually the distal end) becoming softer and dark brown; and (3) the stage called ***tamr,*** when the dates are fully ripe, brown, and soft, at which point they are dried and usually compressed for storage. Due to their high sugar and low moisture content, ***tamr*** dates keep well for months (or even years) without refrigeration or other special measures. Bedouins purchase dates mainly in the ***tamr*** stage, dried and compressed into blocks for compact storage and carriage.

Vidal lists thirty-six recognized varieties of dates grown in al-Ḥasā oasis alone (1955, 163). Some of these names, as folk specifics, are well known and used by the Bedouins in our study area. The list I give here is incomplete; I have included only those that I have personally heard in use by Bedouin informants, and they are given in the approximate order of generally accepted fruit quality. These names are known to the Bedouins primarily as fruit varieties, and the average desert tribesman is unlikely to be able to identify the date palm folk specifics when they are not bearing fruit. It is generally appreciated, however, that the named fruits come from different "kinds" of ***nakhl***.

Generic: ***nakhl*** (the date palm)

Specifics:

khlāṣ (gen.). From ***khāliṣ,*** "pure, genuine." This yellow date is generally believed to be the best variety in the gulf area. Both Bedouins and townspeople consider it to be ***bārid,*** a "cold" variety, which is highly palatable and easily digested (Vidal 1955, 164).

hshēyishī (gen.). Diminutive of ***hashīsh*** (not to be confused with ***ḥashīsh,*** "cut foliage"), "tender, soft." Like the ***khlāṣ,*** this variety is considered to be "cold" (Vidal 1955, 164).

ḥalwah (gen.). ***Ḥalwah*** means "sweet." This highly esteemed large variety comes from oases in northern Arabia.

khnēẕī (gen.). The name is apparently from the root *kh n z,* associated with the idea of "stinking, bad smelling"; the association, if any, is unclear. This large, red-skinned variety is very sweet in the late ***bisr*** and ***ruṭab*** stage.

rzēz (gen.). This yellow variety traditionally has accounted for the bulk of the al-Ḥasā date crop.

Unaffiliated complex: ***al-fiṭrīyāt*** (“those that split the earth”; see section 5.3 for a discussion of this term and the group):

Generic:

fag‘, desert truffles (subterranean fungi). The great cultural importance of this generic is discussed in section 4.3 (figs. 4.7–4.10, CD.339, CD.340).

Specifics:

zbēdī (gen.). Diminutive relative adjective from ***zibd,*** “butter,” in reference to the slightly off-white color, like freshly churned butter, of the ascocarps.

Tirmania nivea (Desf. ex Fr.) Trappe, and probably *Tirmania pinoyi* (Maire) Malençon (fig. CD.340).

khlāṣ (gen.). From ***khāliṣ, khlāṣ,*** “choice, pure.”

Terfezia boudieri Chatin. This species is smaller and reddish brown. From a Shammarī informant, I heard the apparent variant ***ghlāṣ.***

jbēy (gen.) A consultant of the Shammar tribe used the nondiminutive variant ***jibā.*** Its scientific identity has not been determined. The Ruwalah Bedouins use the name ***kama*** for a kind of truffle (Musil 1928a, 15), and it may be a synonym for this specific. This name corresponds to a classical Arabic name for desert truffles (as a generic): *kam’ā’.*

hbērī (gen.). Cf. classical *hubr,* “meat without bones.” Variant ***hōbar*** (Shammar). This specific is possibly “the small desert truffle, *Phaeangium lefebvrei* Pat.” (Alsheikh and Trappe 1983, 88).

blūkh (Shammar). This name is a plural in form. It is reportedly found only in the Syrian Desert, including the part in extreme northern Saudi Arabia. This truffle’s scientific identity is undetermined.

Generics:

‘arjūn (gen.), *Podaxis pistillaris* (L.) Morse. This club-shaped (capless) desert toadstool is widespread in the sandy areas of our study area (and in other parts of the world). It is edible if collected while still young and is eaten baked in campfire ashes (figs. CD.337, CD.338).

ifṭarrah (Banī Hājir). The variant ***fṭūr*** was recorded for mushrooms in Kuwait by Violet Dickson (1955, 103–4). As used by my Hājirī consultants, the name ***ifṭarrah*** refers to capped mushrooms, which are rare in our study area. I have seen at least two different species on different occasions after good rains. Musil noted that mushrooms called ***hōbar*** (the same name given me by a Shammarī for the smallest kind of truffle) were collected and eaten by the Ruwalah (1928a, 15) (fig. CD.336).

dhānūn (gen.). The variant ***dhnūn*** (more commonly applied to *Orobanche* spp.) was heard from a consultant of Āl Murrah. Āl Rāshid of the southern Rub‘ al-Khālī (speakers of a southern Arabic dialect) use the synonym ***bāṣūl.***

Cistanche tubulosa (Schrenk) Wight. Orobanchaceae. BM 1789, 7540, 7612. *Cistanche* is a conspicuous, tuberous root–parasitic herb arising as a leafless, showy flowering spike 20–80 cm high. The showy flowers are mostly 4–5 cm long with the corolla tube yellow to pinkish violet, aging brownish, cylindrical to funnel shaped above. The capsule is ovoid-oblong and about 1.5 cm long. The base of this parasite can be traced to attachments on the roots of desert shrubs including *Haloxylon, Cornulaca,* other Chenopodiaceae, *Zygophyllum,* and apparently *Calligonum* (figs. CD.120, CD.121).

dhnūn (gen.). A variant on the name ***dhānūn,*** for *Cistanche tubulosa,* to which this genus is related. It is applied to three species of *Orobanche* (Orobanchaceae), all leafless root parasites of generally similar appearance. Musil lists *Orobanche,* under the synonym ***zibb adh-dhīkh,*** as one of the plants eaten baked by the Ruwalah in northern Arabia (1928a, 95). This rather puzzling name is possibly a corruption of ***zibb adh-dhīb,*** “wolf penis”; Vivi Täckholm lists both versions for *Orobanche* (she gives ***dhīb*** as Egyptian colloquial *deeb*) (1974, 853).

Orobanche aegyptiaca Pers. BM 1474, BM 1717, 7711. This leafless parasitic herb arises from the ground surface as a spike of flowers, sometimes branched from near base. The flowers are in rather loose and broad spikes, 5–20 cm long; the corollas are blue-violet except at the base and lower lip, 25–35 mm long, with the tube cylindrical below, funnel shaped above, and

deflexed. The long-ovoid capsule is 6–8 mm long. The plant is often found growing on ***ʻarfaj,*** *Rhanterium epapposum* (fig. CD.252).

Orobanche cernua Loefl. BM 1726, BM 4068, 8060. This plant is of similar aspect to *O. aegyptiaca,* growing 10–35 cm high, with flowers 15–20 mm long. The corolla tube is cylindrical, hardly widening above, and constricted above the fruit; in color, it is yellowish or pale violet above, with a pale to dark violet limb; the capsule is ovoid to ellipsoid and 6–12 mm long. I have found it growing on *Lycium* and *Artemisia* (fig. CD.253).

Orobanche mutelii F. W. Schultz. BM 1738, BM 1760, 8067. This dwarfish plant is only 5–10(15) cm high and often has no stem visible beneath the flowers. The flowers are 12–22 mm long with corollas dirty white, often tinged with pale violet; the tube is narrowly funnel shaped. The capsule is ovoid and 6–8 mm long (fig. CD.254).

ṭarthūth (gen.). Synonyms are ***ẓibb al-arḍ,*** from ***ẓibb,*** "penis," + ***al-arḍ,*** "the earth," thus "earth penis," and ***ẓibb al-ḥamād,*** from ***ẓibb*** + ***ḥamād,*** "flat plains," thus "penis of the plains," both referring to the plant's phalloid form.

Cynomorium coccineum L. Cynomoriaceae. 7685, 8652. *Cynomorium* is a fleshy, reddish, club shaped, and leafless root parasite that grows to about 30 cm high; it arises from tubers near host plants, to the roots of which it is connected. Its stem is simple, cylindrical, and about 2 cm in diameter with imbricated scales. The flowers are about 5 mm long and packed in a dense, very dark red, terminal spadix 10–20 cm long. The lower stalks are edible, and the plant is used also to produce a crimson dye (figs. CD.136–39).

13. Generics of unknown life form status:

shbēkah (gen.). Variants include ***shabbākah*** and ***shubbāk*** (Banī Hājir); all forms come from ***shabakah,*** "net," referring to the way this plant covers and entangles its host shrubs. It is applied to two species of *Cuscuta* (Cuscutaceae), *C. planiflora* being the more common.

Cuscuta planiflora Ten. BM 540, BM 1704, 7053. *Cuscuta* is a twining, filiform, leafless parasite growing upon and sometimes

virtually covering other plants with threadlike stems that are usually yellowish in color. The flowers are five merous, in globose clusters 4–10 mm in diameter; the corolla limb has triangular white or reddish lobes. Some flower parts are sometimes purplish; the fruit is a depressed-globose capsule. In our area, it is found on a wide variety of hosts, including *Astragalus* spp., *Horwoodia, Rhanterium, Helianthemum,* and *Fagonia* (figs. CD.131, CD.132).

Cuscuta pedicellata Ledeb. BM 2329. This plant is very similar to *C. planiflora* but distinguishable by its stigmas, which are capitate or subglobose rather than filiform as in *C. planiflora.*

I found a third species, *Cuscuta campestris* Yuncker (BM 1902, BM 2902, 7772), only in oasis cultivation, where a farmer at al-Qaṭīf named it ***sūyah,*** apparently a noun form from *sāʼa,* "to be bad, evil, abominable." It is a serious pest of crops, and its status in the wild flora is uncertain.

I have no data on the life form status of this generic, ***shbēkah;*** I would suspect that further study may show that it is unaffiliated because of its anomalous growth form.

CHAPTER 7

Bedouin Plant Lore in Space and Time

7.1 A Greater Geography and History

USE OF THE BEDOUIN system of plant names and classification is not restricted to eastern or central Saudi Arabia or even to the Arabian Peninsula. It in fact extends westward for some 5,000 km, more than 55 degrees of longitude, and at least seven present nation-states, to the far western edge of the Sahara and within a stone's throw of Atlantic beaches. This is the great western part of the Saharo-Arabian floristic region, where the desert flora largely reproduces that of the Arabian Peninsula. There, wherever Arabic-speaking tribes are found, the Bedouin plant language is in current use, existing side by side with one or more parallel sets of terms used by the original Berber or other early inhabitants. It was carried there by westward-spreading Arab tribes beginning mainly in the middle of the eleventh century. The leading groups were the Banī Hilāl and the Sulaym, who had moved from the Arabian Peninsula into Egypt in the eighth century (Abun-Nasr 1987, 69) and who were unleashed on the countryside to the west around 1050 by the Fatimid ruler al-Mustanṣir, carrying with them Bedouin Arabic (Julien 1970, 72–73).

Today's North African plant vocabulary is not exactly the same as that used by our east Arabian consultants. Dialectal shifts have occurred, and Berber and other loan words have been mixed in. But much remains that is familiar. Writing in the middle of the twentieth century, French botanists working in territories now part of Mauritania prefaced their collection of vernacular plant names with the observation that: "The Maures classify plants into two categories: woody plants and ephemeral herbaceous vegetation. . . . A. The woody plants, trees, bushes and shrubs are called *'ṣṣḍar'* (in the collective). This word is the Maure representation of the classical [Arabic] *šağar*. . . . B. The ephemeral herbaceous vegetation. These are the *therophytes,* that is to say 'the ephemeral vegetation of annual herbaceous plants appearing after rain' (Monod) . . . as a group the *acheb*" (Monteil and Sauvage 1949, 27, my translation).

TABLE 7.1. Comparison of Western Saharan and Najdī Arabic plant names

Western Saharan		Najdī Arabic	
akrich	*Aeluropus littoralis*	**'ikrish**	*Aeluropus lagopoides*
alenda	*Ephedra alata*	**'alandā**	*Ephedra alata*
sbot	*Stipagrostis pungens*	**sabaṭ**	*Stipagrostis drarii*
nsi	*Stipagrostis plumosa*	**nuṣī**	*Stipagrostis plumosa*
art	*Calligonum comosum*	**arṭā**	*Calligonum comosum*
hammouidh	*Rumex vesicarius*	**ḥummēḍ**	*Rumex vesicarius*
had	*Cornulaca monacantha*	**ḥādh**	*Cornulaca monacantha*
damran	*Traganum nudatum*	**ḍumrān**	*Traganum nudatum*
remt	*Haloxylon scoparium*	**rimth**	*Haloxylon salicornicum*
souit	*Suaeda mollis*	**suwwād**	*Suaeda vermiculata*
talha	*Acacia raddiana*	**ṭalḥ**	*Acacia raddiana* *Acacia gerrardii*
sder	*Ziziphus*	**sidr**	*Ziziphus* (two spp.)
ethl	*Tamarix aphylla*	**athl**	*Tamarix aphylla*
tarfa	*Tamarix pauciovulata*	**ṭarfā**	*Tamarix* spp.
chagar	*Matthiola livida*	**shgārā**	*Matthiola longipetala*
goulglane	*Savignya parviflora*	**glēgilān**	*Savignya parviflora*
choubrek	*Zilla macroptera*	**shibrig**	*Zilla spinosa*
relga	*Pergularia tomentosa*	**ghalgah**	*Pergularia tomentosa*
rerdag	*Periploca laevigata*	**ghardag**	*Nitraria retusa*
djada	*Marrubium deserti*	**ja'dah**	*Teucrium polium*
neggoud	*Anvillea radiata*	**nigd**	*Anvillea garcinii*
mkar	*Launaea resedifolia*	**makar**	*Polycarpaea repens*
arfedg	*Rhanterium adpressum*	**'arfaj**	*Rhanterium epapposum*

In table 7.1, I show plant names used in northern Africa and recorded in two separate lists by Hilde Gauthier-Pilters, who in the course of her unique studies of camel grazing practices in this same area acquired an intimate knowledge of the flora and its vernacular nomenclature (Gauthier-Pilters 1961, 1965). I have added my own Najdī Arabic records beside them. Even in this author's informal French-style transliteration, the near identity of her names and their applications with mine are clearly evident. Similar examples can be found in botanical works dealing with regions stretching back eastward to the Red Sea (e.g., Quézel and Santa 1962–63; Täckholm 1974).

Bedouin Arabic plant nomenclature also has great depth in time. Few ethnobotanists have the luxury of viewing the diachronic development of

their folk nomenclature and classifications back beyond one or two hundred years, if that. Some quirks in the development of Arabic as a literary language, however, give us the opportunity to view Bedouin plant names and plant classification as they were more than eleven hundred years ago and to compare that state of affairs with today's practice. This possibility arises from several factors. First, among the Islamic scholars of the first two centuries after the Prophet Muḥammad, there was overwhelming concern for the exploration and analysis of what was becoming classical Arabic, essentially the language of the Prophet's revelation. Meanwhile, the highest form of art continued to be that fund of Bedouin poetry, couched in similar classical style but as yet largely unwritten, that had developed in the century or two immediately preceding the time of Muḥammad. At the same time, the Islamic Empire was expanding at an explosive pace, bringing into its fold peoples whose native languages were not Arabic. Early scholars, some of them of non-Arab origin themselves, were thus greatly concerned with the codification of Arabic grammar to establish a firm base for study of the Qur'an and classical verse and for the development of dictionaries to maintain Arabic vocabulary. These concerns were particularly acute in the urban milieu of Iraq after the move of the Islamic capital to Baghdad in the mid–eighth century A.D. Here the life of Arabs, amid an increasingly foreign population, was already becoming disconnected from the peninsular homeland (Fück 1955, 47). Schools of grammar and philology became established at Basra and Kufa in Iraq and vied with each other in the collection and analysis of Arabic linguistic materials.

For us, the significant aspect of all these developments is the fact that the ideal standard for the Arabic speech under study was held to be not that of the cities or of the working scholars themselves. Rather, it was the speech of Bedouins—preferably those from the midsection of the Arabian Peninsula (Blachère 1950, 38)—which was held to be closest to poetic Arabic and as yet unsullied by contact with non-Arabs in the burgeoning city culture of Baghdad. The approach taken by the philologists was to enlist Bedouin informants and consultants, much as a linguist or ethnobiologist might do today, in their study and collection of the vocabulary of desert nomadism that was essential to the full understanding of pre-Islamic and early Islamic Arabic poetry (Fück 1955; Versteegh 1997). Thus, Régis Blachère titles his sketch of this unique scholarly relationship "Les savants Iraqiens et leurs informateurs Bédouins aux II^{e}–IV^{e} siècles

de L'Hégire" (1950). Joshua Blau (1963) has shown that some of the traditional lore associated with the use of these Bedouin consultants is probably apocryphal, in particular the stories of Bedouin arbitrators being called in to settle disputes of specialists in issues of classical grammar. He concludes, however, that in matters of lexicography Bedouins were indeed consulted and played an important role. These Bedouin consultants were called *ruwāt* (sing. *rāwī*), literally "reciters." This term referred primarily to those who had committed to memory great stores of classical poetry and who could recite these poems with proper classical vocalization. It also applied to informants who provided general linguistic information, such as the vocabulary that figured in such verse (Jacobi 1995). Inasmuch as descriptions of desert plants and animals figured prominently in the classical oral poetry tradition, the works of early philologists often included specialized vocabularies, derived from Bedouin consultants, in various fields of natural history.

Of the various works entitled *Kitāb an-nabāt* or *Kitāb an-nabāt wash-shajar* (The Book of Plants or The Book of Plants, Shrubs, and Trees) compiled by the early philologists (many of which apparently no longer exist even in manuscript), by far the most important was that by Abū Ḥanīfah ad-Dīnawarī (d. ca. A.D. 895). Bernhard Lewin, who has edited and published Abū Ḥanīfah's *Book of Plants,* says of it:

> Of all the learned works of Abū Ḥanīfa ad-Dīnawarī (d. about 282/895) the most popular one is undoubtedly his *Kitāb an-nabāt*. At all times it has been linked with the name of Dīnawarī, who, down to this day, is known in the Orient simply as "the Author of the Book of Plants." In fact, the rich botanical nomenclature of the classical Arabic language was known to later generations of philologists, lexicographers and writers on botanical and pharmacological matters essentially through this work of Dīnawarī, considered also by Western orientalists as one of the very great contributions in the field of Arabic philology and as a specimen of genuine scholarship. (Lewin 1953, intro., 1)

Lewin has shown that this work consists of two sections, one a series of monograph discussions about various aspects and uses of plants, the other a listing of plant names and descriptions in alphabetical order. Parts of the work have been widely quoted in early Arabic dictionaries, but no manuscript of the original text was known until 1947, with the discovery in Medina of a fragment (forty manuscript leaves) of the book (Lewin

1953). A manuscript volume was found about a year later at the University Library in Istanbul. This was the beginning of the alphabetical section, covering the initial letters *alif* to *zāy.* Lewin edited this volume into a printed Arabic text (Lewin 1953). The source material used by ad-Dīnawarī was both written and oral. Lothar Kopf, in his review of Lewin's publication, made particular note of the use of Bedouin informants:

> Remarkable is the wealth of information which Abū Ḥanīfa derived directly from the mouth of Bedouins. He was one of the last representatives of that epoch in which practically all philologists extensively and systematically used the Arabs of the desert for their researches. Later on, only few ones are reported to have followed this method, which completely fell into disuse after the time of al-Cauharī [the lexicographer Abū Naṣr al-Jawharī, d. A.D. 1002 or 1008]. Although Abū Ḥanīfa derived his information from Bedouins who belonged to various tribes and who stemmed from different parts of the Arabian Peninsula . . . the tribe of Asad is mentioned . . . a Bedouin from 'Umān . . . another from *aqāṣī arḍ al-'arab* [the distant parts of the land of the Arabs]. . . . [I]t need not be assumed that he had visited all these places himself. He probably met the Bedouins, as did practically all his predecessors . . . in or near his various places of domicile. (1955, 150)

Yet another part of *Kitāb an-nabāt*—the third part of the overall work, consisting of monographs on specific groups of plants or uses—was later discovered among Arabic manuscripts of the Yale University Library, and Lewin edited and published it in Arabic text (Lewin 1974). Meanwhile, in 1973 Muhammad Hamidullah published a reconstitution of the remainder of the alphabetical section (letters *sīn* through *yā*) by compiling quotations attributed to ad-Dīnawarī from the later major Arabic dictionaries (Hamidullah 1973).

It is known from references in extant portions of the *Kitāb an-nabāt* that one of Abū Ḥanīfah's monographs was titled *Bāb tajnīs an-nabāt* (Lewin 1953, 3), which can mean "Section on the Classification of Plants" (my translation). The text of this monograph, which would have provided an invaluable point of comparison for our present-day Bedouin plant classification, is unfortunately not among the parts so far discovered. Nevertheless, some aspects of this framework can be gleaned from remarks in other sections and in other works.

I have chosen mainly the alphabetic section of *Kitāb an-nabāt,* using Lewin's edition of the first part and Hamidullah's reconstitution of the remainder, as a point of comparison with the plant names recorded from Bedouin consultants today. The results are shown in appendix A. This tabulation shows that of 261 present-day names, 190 (73 percent) have in the ninth-century texts either exact equivalents or very close cognates of the same linguistic root. Of these 190, a total of 124 (65 percent) are accompanied by at least some evidence that they were applied to the same folk generics that they label today, and 36 (19 percent) appear to differ. The remainder (16 percent) lack sufficient description to be assigned either way. Such early works also list many of the same uses of the same plants that the Bedouins make of them today, such as for food, dyeing, tanning, and medicines. The shrublet ***ramrām,*** for example, was used to treat snakebite, as it is today, at least as early as the ninth century A.D.

Of the present-day generics without such early historical cognates, the majority tends to be productives, otherwise complex lexemes or descriptives, rather than the simple, unanalyzable names that form the core of the Bedouin plant lexicon—"core" in the sense of referring to those perennial plants that make up the great bulk of the visually prominent and economically useful desert vegetation. This core group—including such generics as ***rimth, 'arfaj, thmām, sabaṭ, nuṣī, arṭā*** (today's southern Najdī ***'abal***), ***harm, ghaḏā, ḥādh, sidr, ṭarfā, salam, samur,*** and ***ṭalḥ***—has carried these names without change for more than 1,100 years. The same can be said of the more common annuals of the desert landscape, such as ***yanam, gaḥwīyān, ḥōdhān,*** and ***ḥuwwā.***

The early existence of what I call "growth-stage generics" (section 5.3.8) is proved in the lexicographical literature. At least one example involves exactly the names and applications used today. The philologist al-Aṣma'ī (d. A.D. 831) points out that after *ḥalam* has dried out, it is called *ḥamāṭ* (Al-Ghunaym 1972, 19). He also, as do Bedouins today, provides various growth-stage or condition names for ***nuṣī,*** the important grazing grass *Stipagrostis plumosa.* Thus, *naṣī* (as he vowels it), when it has gone dry, is called *ḥaly;* after it has darkened and broken up, it is called *dawīl* (Al-Ghunaym 1972, 22).

There are a few unexpected absences in the old data. We find no ***rūth*** saltbush, so important to the northern tribes today, but that species probably lies in one of the few old ***ḥamḏ*** plant (saltbush) names listed in the

manuscripts that we have not yet identified. ***Samḥ,*** the *Mesembryanthemum* that is so important, at least until relatively recently, for its edible seeds, carried the name *faththh* in those early times, although the names of two of its seed-producing close relatives have not changed. We also look in vain for two important annuals with edible rootstock: ***rubaḥlah*** and ***ḥambizān.*** These plants and others might be identifiable upon closer study of differently named edible plants listed by Abū Ḥanīfah. The name *faq',* for desert truffles, seems to have been used in those times for a nonedible, even poisonous toadstool, and *kama'* was the truffle designator.

The question of early terms for the more inclusive categories of plants and the overall matter of classification are less straightforward. The classes ***shajar*** and ***'ishb*** as given here were obviously well known to Abū Ḥanīfah and his near contemporaries. *Shajar* seems to be accepted as a word needing no definition, although remarks by Abū Ḥanīfah on other plant classes as compared to *shajar* make it clear that *shajar* are plants whose main stem is not destroyed by the winter cold (Lewin 1953, 90), thus referring to both trees and shrubs as well as perennial herbs, as is the case today. Abū Ḥanīfah's several references to changes in different plant classes as effects of winter indicate he is viewing these classes not as a Bedouin of the Arabian Peninsula but rather as a more cosmopolitan botanist familiar with more temperate climes, including the sometimes frosty mountains of his native Iran. Thus, he defines the class *'ushb* (the Bedouin ***'ishb***) as (my translations) "whatever [plants] are destroyed by winter [cold] and that grow forth again from [buried] rootstock or seeds" (Hamidullah 1973, 133) rather than as "those killed by summer drought," as Bedouins say today. He uses *baql* as a general term for "herbs" (as opposed to shrubs or trees) and divides them into two classes, one called *adh-dhukūr* (literally "the male ones") that are thicker and harder, and the other called *al-aḥrār* (literally "the true ones") that are softer and finer (Lewin 1953, 182). It is unclear to what extent the Bedouins of that time actually used these terms. My modern Bedouin consultants did not recognize the terms *adh-dhukūr* or *al-aḥrār*. The term *baql* is understood now as a general Arabic word referring to edible "herbs" or "greens" and is used in some Arab countries today in specific reference to the salad herb *Portulaca oleracea.*

Abū Ḥanīfah's work, as we know from an entry in his alphabetic section, included a monograph on the *'iḍāh,* the class of spiny trees given the

same name by my Bedouin consultants today. That section is not included in the monograph material known to be extant, but use of the term by other early philologists provides a clear account of its application. Al-Aṣma‘ī (d. A.D. 831) defines the class as "all trees that have thorns and which grow big" (Al-Ghunaym 1972, 23, my translation). The examples he gives of this class, beginning with *ṭalḥ, salam, sayyāl, ‘urfuṭ,* and *samur,* show that its focus was then, as now, on the genus *Acacia*. Ibn Khālawayh (d. A.D. 980) divides the class into two subgroups: the large thorny trees are called *al-‘iḍāh al-khāliṣ* (the true ‘iḍāh), and the small ones are called *al-‘iḍḍ* or *ash-shirs* (Nagelberg 1909, 1). Acacias are given as examples of the first; the majority of the second consists of spiny bushes of western Arabia and the Ḥijāz mountains, although Ibn Khālawayh includes ***shubrum*** *(Zilla spinosa),* which I have given here.

The present-day common Bedouin word for bush, ***shima‘,*** is rather surprisingly quite absent from these early botanical works, as is its equivalent among today's northern tribes, ***gish‘.*** Nor does there appear to be any other life form name referring only to "bush." Abū Ḥanīfah describes a life form class called *janbah,* intermediate between herbs and ***shajar,*** but this term appears to refer to perennials that die back to ground level and maintain a persistent rootstock while (unlike a tree or the majority of bushes) losing its upper stem (Lewin 1953, 90). Among my consultants, some northern tribesmen used the term ***janbah,*** but only as a generic name for the low zygophyllaceous perennial *Fagonia bruguieri,* given the primary name ***drēmā*** here, which, interestingly, is in fact intermediate in growth form between an herb and a shrublet. The apparent absence of a Bedouin term for "bush" a millennium ago is of interest, as discussed in section 5.3.3, with respect to Cecil Brown's (1977,1984a) evolutionary scheme for the development of life form terms (see section 5.3.1). The apparent late addition of "bush" as a class supports his hypothesis that "tree" and "grerb" (or "grass") would be encoded first in any language development.

Abū Ḥanīfah did not originate these classes that Bedouins do not recognize today. As Lewin points out (1953, intro., 6), Abū Ḥanīfah quotes Abū ‘Amr ash-Shaybānī (d. A.D. 821) concerning the placement of plants into the categories *adh-dhukūr, aḥrār,* and *janbah.* He also quotes lines of poetry, including some by Dhū ar-Rummah of the Omayyad period (A.D. 661–750), referring to *baql* of the *dhukūr* and *aḥrār* classes (Lewin 1953, 182). The same terms, sometimes with identical identifying phrases, are

found in the *Kitāb an-nabāt* of al-Aṣmaʻī, who groups his lists of herbs under these headings (Al-Ghunaym 1972). The later writer Ibn Khālawayh provides a somewhat different picture, dividing all vegetation between *shajar* and *kalā'* (herbage), the latter subdivided into *'ushb,* the "male" type that is big and thickish, and *baql,* the type that are "fine" and "soft" (Nagelberg 1909, 10). He goes on to list many kinds of annuals, virtually all of which are individually designated with the term *'ushbah* ***('ishbah),*** just as a Bedouin would do today, and probably as Bedouin consultants did then.

Today's Bedouin placement of plants into ***ḥamḏ*** and ***khillah*** based on the camel's nutritional requirements was also clearly recognized in Abū Ḥanīfaḥ's time and no doubt before then. He seems to have come to about the same conclusion I have with regard to the nature of ***ḥamḏ*** and ***khillah***. Under the heading *"khallah* or *khullah"* in his alphabetical section, Abū Ḥanīfah defines that word as meaning "pasturage in which there is no saltiness in its bushes or other [plants or perhaps even ground]" (my translation). He notes that *khullah* may be said to be a kind of "land," whereas the term *ḥamḍ* is not so used, implying that *ḥamḍ* can refer only to plants themselves (Lewin 1953, 154). Al-Aṣmaʻī had earlier described the *ḥamḍ/khillah* contrast, quoting 1,100 years ago the same saying that Bedouins repeated for me: "*khullah* for camels is like bread, and *ḥamḍ* [for them] is like meat." *"Ḥamḍ,"* he says, "is that which is saline, while *khullah* has no saltiness in it" (Al-Ghunaym 1972, 17, my translations). He goes on to list the plants classed as *ḥamḍ,* the majority of which carries precisely the same saltbush names used by Bedouins today.

A full comparative analysis of early Islamic plant classification is outside the scope of this study. I may say from my brief survey here that much in early Islamic usage is very similar to Bedouin usage today, whereas some, such as the grouping of *baql* into *dhukūr* and *aḥrār,* seems quite different. In the early usage, as found in books, we seem to have an underlying folk system with terms much like those found today overlain by a rationalized view of plants added by writers familiar with more temperate areas and a wider range of plant growth forms. The early philologists were scholars well versed in formal, written grammar, which has a strong transitive taxonomic structure (they might have said, "A noun of kind is a kind of collective, which is a kind of noun, which is a kind of word"). A tendency toward "overdifferentiation" might not be unexpected.

FIGURE 7.1. Changing times. Arrival of the minipickup. Drawing by Angie Hall, camel market at al-Hufūf, 1976. Original in colored inks on glass. The colored original is shown as figure CD.44.A in the back-pocket CD of this volume. Used with permission.

Overall, however, considering both my comparison of generic names and the previous remarks on terms of classification, my data suggest that a Bedouin of east-central Arabia would feel quite at home in discussing desert plants with his counterpart of 1,100 years ago. The terminological differences would hardly exceed that variation experienced today between Bedouins of different geographical parts of the Najdī Arabic dialect territory—another testimony to the conservatism and endurance of oral tradition among these pastoralists.

7.2 Indigenous Botanical Knowledge in a Changing World

As indicated by remarks in the introduction to this study, Bedouin lifestyle and practices at the time of my data collection between 1960 and the mid-1970s were still much as they had been at the time of Alois Musil's travels, early in the twentieth century. Beginning with the flood of "petrodollars" in the 1980s, however, the central Arabian Peninsula fairly plunged into change, with strong consequences for both the settled and nomadic

populations. My brief remarks here concern only the impact on traditional plant knowledge; other writers (see particularly Lancaster 1997) have dealt with the broader scope of Bedouin adaptations to modernism (fig. 7.1).

The Saudi Arabian boom years took me away from the Bedouins as new oil company projects, just like the government ones, soaked up all available manpower and then recruited thousands of additional people from outside the country. But even chance encounters told me that Bedouin life was no longer what it had been. I remember when, while out on a weekend desert camping trip, I stopped to inquire directions from a camel herder. He had looked slightly unusual from a distance; face to face he was smiling, but I was shocked to find that he spoke little Arabic and knew nothing of the country beyond the horizon. He was from Pakistan. A few months later I had another such encounter, this time with a Sudani who, although voluble in his brand of Arabic and happy to talk with me all day, was of little help with local topography and had obviously been instructed by his employer not to talk to strangers about where the family was. At least some Bedouins were now hiring foreigners to herd their camels. I wondered if "checking on the herd" was becoming, for its owners, not much more than an excuse for weekend picnics.

While visiting Saudi Arabia in 1997, I hired a four-wheel-drive vehicle and drove out to the ʻAyn Dar camel trough area hoping to find some members (or at least their descendants) of the Ghayāthīn Āl Murrah I had known there thirty-five years earlier. It was summer camp time, but not a single black tent was to be seen. I finally stopped at a drilled water well, where off at a distance I could see a modern, concrete block house and walled courtyard. Inquiring at the door, I discovered that the owners were indeed Ghayāthīn and that they recognized the names of my old friends. The house had air-conditioning units in two of the windows, and a motor generator sat outside, providing electricity for those units as well as for a refrigerator, lights, and television.* I was invited to sit on rugs in the courtyard, where coffee, dates, and a large bowl of camel milk were

*The Bedouin term for an electrical generator, also used in other dialects of Arabic, is ***mwallid.*** It is a present active participle meaning literally "that which gives birth" or "that which causes to give birth" and is a good example of Arabic's facility for coining new terminology through lexical extension. The use of the common participial *m-* prefix here does not occur in Bedouin plant names, a fact that underscores their basically substantive nature as emphasized in section 5.3.6.

served (fig. CD.44). Near sunset, dust appeared on the horizon, and a herd of fine, black ***majāhīm*** camels were driven in to the electrically pumped well, all herded by a youth driving slowly in a Datsun minipickup, skillfully managing the herd with his maneuvers around the back of the large camel group.

There are indeed fewer Bedouins out on the land now even though the herds themselves seem hardly to have diminished. Hired labor in part accounts for this state of affairs, and today's universal mechanization of herding life means fewer people are required to maintain the same numbers of stock. One of the great benefits of the oil boom was the extension of the basic education system to all corners of the kingdom, and the country now has several universities. Jobs in government or business require at least a secondary education, and a college degree is often considered essential. Education, with its required regular attendance, is difficult to universalize in a nomadic pastoral setting, and town populations have been growing at the expense of the countryside. The 2008 e-mail directory of the Saudi Arabian Oil Company listed 606 employees with the surname "Al Hajri" and 339 with the surname "Al Marri," indicating their membership in the Banī Hājir and Āl Murrah tribes. There are doubtless many others who use patronymics or family names instead of the tribal designation for directory purposes.

The now nearly complete trend toward universal primary and secondary education will of course have some effects on folk botanical nomenclature. School graduates are doubtless already prepared to argue for the existence of a labeled plant class of kingdom rank. The prototypical ***shajarah,*** perennial plant, is already becoming, for some first graders, the very un-Arabian, red-fruited apple tree portrayed with "*shīn* for *shajarah*" in some ABC books patterned after Egyptian and Lebanese models. But these changes are of minor consequence. More significant would be the loss of desert ecological knowledge associated with the more detailed structure and content of plant classification and nomenclature.

There may be some reasons for optimism, though. Bedouin plant talk is closely involved with the wider aspects of the pastoral tradition and with general poetic literature. One can foresee, in Saudi Arabia, a trend toward ranch-style meat production using concentrated feeds rather than desert grazing. But this approach would probably involve sheep rather than camels. Nor are camels going out of style. They are still being kept

in large herds over large areas, and as long as Saudi nationals are owning and managing them—even if at greater arm's length—there will be some talk of grazing and plants. Also, unlike the case with some pastoral groups with shrinking populations of native speakers, Najdī Arabic speakers are widespread and growing in number, and they have a highly developed oral and (now) written literature. Such records, just as a corpus of literature preserved for us the outline of Bedouin plant terminology in use a millennium ago, might continue to enlighten or at least entertain generations to come. Without firsthand observation and hands-on use of plants by the younger generation, however, there is bound to be a loss of practical field lore—some withering of that facility for placing plants in the scheme of a world where leafy things, except in the rare instant of a ***rabī‘,*** are both few and far between.

Appendix A

Present-Day and Early Islamic Plant Names

THE TABLE IN THIS APPENDIX compares the Bedouin plant names in my data with those in the classical text *Kitāb an-nabāt* (The Book of Plants) of Abū Ḥanīfah ad-Dīnawarī (d. A.D. 895). The abbreviations (L) and (H) in front of page numbers refer to Lewin 1953 and Hamidullah 1973. References are also made to and abbreviations used for two other early classical works when in a few cases names included in my study were not found in Abū Ḥanīfah: (A) the *Kitāb an-nabāt* by al-Aṣma'ī (d. A.D. 831) and edited by 'Abd Allah Yūsuf al-Ghunaym (1972) and (IK) the main text section of the *Kitāb ash-shajar* (The Book of Trees and Shrubs) by Ibn Khālawayh (d. A.D. 980) edited by Samuel Nagelberg (1909). The first column comprises the Bedouin names given in my study, the second the same names rewritten in the modified U.S. Board on Geographic Names transliteration I follow for classical Arabic, and the third the names as written in the sources indicated, again in Board format. Sources and page numbers are given in the fourth column. The fifth column is an attempt to assess, if only very roughly, the applications of my names in the ninth or tenth centuries: I have reviewed the plant descriptions provided by the original authors and in this column use a plus sign (+) if the description suggests the plant is the one so named today, a zero (0) if the description is essentially neutral or too incomplete for judgment, and a dash (–) if the description seems to indicate a different plant. The early classical descriptions are incomplete and seldom conclusive. Needless to say, the decisions on which indicator to use involved a large measure of personal judgment on my part, but I think the results will have some usefulness given my relatively long field experience with the Arabian flora.

The main body of the table comprises all folk generics, including the majority of names listed as synonyms in my descriptive list (chapter 6); the second, shorter part lists terms of greater inclusiveness.

TABLE A.1. Generics and life forms

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
‘abal	*‘abal*	*‘abāl*	H118–19	–
abū nashr	*abū nashr*			
abū thrēb	*abū thurayb*			
‘adām	*‘adām*			
‘ādhir	*‘ādhir*	*‘udhār*	A19	–
‘aḏīd	*‘aḍīd*	*ya‘ḍīd*	H348–49	+
‘aḏris	*‘aḍris*	*‘aḍras*	H141–42	0
‘agrabān	*‘aqrabān*			
‘āgūl	*‘āqūl*			
alāl	*alāl*			
‘alandā	*‘alandā*	*‘alandá*	H151	+
‘algā	*‘alqā*	*‘alqá*	H150–51	+
‘andab	*‘andab*	*‘andam*	H156	0
‘anṣalān	*‘anṣalān*	*‘unṣalān*	H156–57	+
‘arād	*‘arād*	*‘arād*	H127	+
‘arfaj	*‘arfaj*	*‘arfaj*	H129–30	+
argā	arqā			
‘arjūn	*‘arjūn*	*‘arājīn (pl.)*	H246	+
arṭā	*arṭā*	*arṭá*	L23–25	+
‘aṣal	*‘aṣal*	*‘aṣal*	H139–40	+
athl	*athl*	*athl*	L13ff.	+
bābūnaj	*bābūnaj*	*bābūnaj*	L30	+
bardī	*bardī*	*bardī*	L50–51	+
barwag	*barwaq*	*barwaq*	L60–61	+
basbās	*basbās*	*basbās*	L59–60	+
b‘ēthirān	*bu‘aythirān*	*‘abaythirān*	H120–21	+
birkān	*birkān*	*birkān*	L62	0
bwēḏā	*buwayḍā*			
da‘ā‘	*da‘ā‘*	*du‘ā‘*	L173	+
ḏa‘ah	*ḍa‘ah*	*ḍa‘ah*	H101	+
dabghah	*dabghah*			
ḏabyah	*ẓabyah*			
dahmā	*dahmā*	*dahmā’*	L174	+
dha‘lūg	*dha‘lūq*	*dhu‘lūq*	L181	+

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
dhanabān	*dhanabān*	*dhanabān*	L181–82	–
dhānūn, dhnūn	*dhānūn, dhunūn*	*dhu'nūn*	L180–81	+
dmāgh al-jarbū'	*dimāgh al-jarbū'*			
drēmā	*duraymā*	*darmā'*	L174	0
ḍumrān	*ḍumrān*	*ḍumrān*	H103	+
duwwēd	*duwwayd*			
fag'	*faq'*	*faq'ah*	H191	–
fānī	*fānī*	*afānī*	L27–29	0
gaḍgāḍ	*qaḍqāḍ*	*qaḍqāḍ*	H215	+
gaf'ā	*qaf'ā*	*qaf'ā'*	H219–20	+
gaḥwīyān	*qaḥwiyān*	*uqḥuwān*	L29–30	+
garmal	*qarmal*	*qarmal*	H205	+
garnuwah	*qarnuwah*	*qarnuwah*	H207	–
gaṣbā	*qaṣbā*	*qaṣab*	A30	–
gaṭaf	*qaṭaf*	*qaṭaf*	H216	–
gaṭb	*qaṭb*	*quṭb*	H215	+
gēṣūm	*qayṣūm*	*qayṣūm*	H227	+
ghaḍā	*ghaḍā*	*ghaḍá*	H176–77	+
ghāf	*ghāf*	*ghāf*	H166	+
ghalgah	*ghalqah*	*ghalqah*	H178–79	+
gharaz	*gharaz*	*gharaz*	H169–70	+
ghardag	*ghardaq*	*gharqad*	H171	+
ghrērā	*ghurayrā*	*ghurayrā'*	H168	+
girḍī	*qirḍī*	*qirḍi'*	H201	–
gitt	*qitt*	*qatt*	H188–90	+
gnēfidhah	*qunayfidhah*			
grēṭā	*qurayṭā*	*qurṭ*	H201	–
gulēgilān*, *gulgulān	*qulayqilān, qulqulān*	*qulqulān*	H223–24	+
gurḥān	*qurḥān*			
gurm	*qurm*	*qurm*	H204–5	+
gurrēs, garrāṣ	*qurrayṣ, qarrāṣ*	*qurrāṣ*	H199–200	+
gṭēnah	*quṭaynah*	*quṭn*	H217–18	–
haddārat al-jamal	*haddārat al-jamal*			
ḥādh	*ḥādh*	*ḥādh*	L118–19	+

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
haltā	*haltā*	*haltá*	H343	–
ḥambaṣīṣ, ḥamṣīṣ	*ḥambaṣīṣ, ḥamṣīṣ*	*ḥamaṣīṣ*	L115	+
ḥambizān	*ḥambizān*			
ḥamḏ al-arnab	*ḥamḍ al-arnab*			
ḥanḏal	*ḥanẓal*	*ḥanẓal*	L134–39	+
ḥanwah	*ḥanwah*	*ḥanwah*	L107–8	–
harās	*harās*	*harās*	H341	+
ḥardhā	*ḥardhā*			
harm	*harm*	*harm*	H342	+
ḥarmal	*ḥarmal*	*ḥarmal*	L102–4	+
ḥārrah	*ḥārrah*	*ḥārrah*	IK15	+
harṭabīl	*harṭabīl*			
harṭallas	*harṭallas*			
ḥaṣād	*ḥaṣād*	*ḥaṣād*	L113–14	+
ḥaṣal	*ḥaṣal*	*ḥaṣal*	L128	–
hashmah	*hashmah*			
ḥatharah	*ḥatharah*			
haṭlas	*haṭlas*			
ḥazzā, ḥazzaz	*ḥazzā, ḥazzaz*	*ḥazā'*	L111–12	0
ḥillab	*ḥillab*	*ḥullab*	L104–5	+
ḥinṭah	*ḥinṭah*	*ḥinṭah*	L125	+
ḥlēwā	*ḥulaywā*	*ḥulāwā*	IK8	+
ḥōdhān	*ḥawdhān*	*ḥawdhān*	L108–9	+
ḥrēshā	*ḥurayshā*	*ḥarshā'*	L110–11	–
ḥsēkah, ḥasak	*ḥusaykah, ḥasak*	*ḥasak*	L112–13	+
ḥulbah	*ḥulbah*	*ḥulbah*	L106–7	+
ḥummēḏ, ḥammāḏ	*ḥummayḍ, ḥammāḍ*	*ḥummāḍ*	L115–16	+
ḥurbuth	*ḥurbuth*	*ḥurbuth*	L122	+
hurṭumān	*hurṭumān*			
ḥuwēdhān	*ḥuwaydhān*	*ḥādh*	L118–19	+
ḥuwwā	*ḥuwwā*	*ḥuwwā'*	L109–10	+
'iḏat al-ḥāyish	*'iḍat al-ḥā'ish*			
idhkhir	*idhkhir*	*idhkhir*	L33	+
idhn al-ḥimār	*idhn al-ḥimār*	*udhun al-ḥimār*	L44	0

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
'ifēnah	*'ufaynah*			
ifṭarrah, fṭūr	*ifṭarrah, fuṭūr*	*fuṭr*	H190	+
'ijlah	*'ijlah*	*'ijlah*	H126	o
'ikrish	*'ikrish*	*'ikrish*	H146–47	+
'ishbat umm sālim	*'ushbat umm sālim*			
'ishrig	*'ishriq*	*'ishriq*	H136–38	+
'itr	*'itr*	*'itr*	H121–22	+
ja'dah	*ja'dah*	*ja'dah*	L88	+
jahag	*jahaq*			
jalwah	*jalwah*			
janbah	*janbah*	*janbah*	L90	–
jathjāth	*jathjāth*	*jathjāth*	L87–88	+
jbēy, jibā	*jubayy, jibā'*	*jab'ah*	H246–47	+
jirjīr	*jirjīr*	*jirjīr*	L96	o
jirrēd	*jurrayd*	*ijrid*	L32	+
jrēbā	*juraybā'*			
jurrēs	*jurrays*			
kaftah, kafn	*kaftah, kafn*	*kafnah*	H245	o
kaḥīl, kaḥlā	*kaḥīl, kaḥlā*	*kaḥlā'*	H234–35	o
kalbah	*kalbah*	*kalbah*	H245	o
karī	*karī*	*karī*	H240	o
karrāth	*karrāth*	*kurrāth*	IK13	+
khaḍir	*khaḍir*	*khaḍir*	L149	o
khafsh	*khafsh*			
khāfūr	*khāfūr*	*khāfūr*	L160	+
kharshaf	*kharshaf*			
khaṣāb	*khaṣāb*	*khaṣbah*	L143	–
khaṭmī	*khaṭmī*	*khaṭmī*	L161–62	o
khiḍrāf	*khiḍrāf*	*khidhrāf*	A18	+
khifjī	*khifjī*	*khafaj*	L164	o
khinnēz	*khunnayz*			
khirrēṭ	*khurrayṭ*	*khurāṭ*	L164	–
khirrēz	*khurrayz*	*kharazah*	L159	+
khirwa'	*khirwa'*	*khirwa'*	L145–46	+

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
khiyyēs	*khiyyays*	*khīs*	L156	o
khubbēz	*khubbayz*	*khubbāz*	L162	o
khushshēn	*khushshayn*	*khushaynā'*	L163	o
khzāmā	*khazāmā*	*khuzāmá*	L156–58	+
kidād	*kidād*	*kudād*	IK24	o
kirsh	*kirsh*	*karish*	H237–38	–
kitā'ah	*kitā'ah*			
krā' al-ghurāb	*kurā' al-ghurāb*			
kurrēsh	*kurraysh*	*karish*	H237–38	–
labnah	*labnah*			
liḥyat at-tēs	*liḥyat at-tays*	*liḥyat at-tays*	H256	+
makar	*makar*	*makr*	H280–81	+
maknān	*maknān*	*maknān*	H281	+
marār	*marār*	*murār*	H266–67	+
markh	*markh*	*markh*	H269–70	+
mḥarūt	*maḥrūt*	*maḥrūt*	H264–65	+
millēḥ	*mullayḥ*	*mullāḥ*	H282–83	+
mishṭ adh-dhīb	*mishṭ adh-dhi'b*			
mlēlah	*mulaylah*			
mṣa'	*maṣa'*	*maṣa'*	H274	–
msēkah	*musaykah*			
mussē'	*mussay'*			
nabag	*nabaq*	*nabaq*	H32–33	+
nafal	*nafal*	*nafal*	H328–29	+
nagī', naggī'	*naqī', naqqī'*			
najīl	*najīl*	*najīl*	H291–93	–
nakhl	*nakhl*	*nakhl*	H293ff.	+
namaṣ	*namaṣ*	*namaṣ*	H331	+
nigd	*niqd*	*nuqud*	H330	o
nuṣī	*nuṣī*	*naṣī*	H326	+
'ōsaj	*'awsaj*	*'awsaj*	H160–62	+
rā	*rā*	*rā'*	L190–91	+
ragam	*raqam*	*raqamah*	IK18	+
ragrūg	*raqrūq*			

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
rāk	*rāk*	*arāk*	L2–10	+
ramrām	*ramrām*	*ramrām*	L192–93	+
rashād	*rashād*			
rgēyigah	*ruqayyiqah*			
ribl	*ribl*	*rabl*	L195–96	–
rimth	*rimth*	*rimth*	L187–90	+
rkhēmā	*rukhaymā*	*rukhāmá*	L183–84	+
rubaḥlah	*rubaḥlah*			
rughl	*rughl*	*rughl*	L191–92	+
rūth	*rūth*			
sabaṭ	*sabaṭ*	*sabaṭ*	H27–28	+
sa'dān	*sa'dān*	*sa'dān*	H38–39	+
saḥam	*saḥam*	*saḥam*	H30	+
sakhbar	*sakhbar*	*sakhbar*	H31–32	+
salam	*salam*	*salam*	H45–46	+
salīḥ	*salīḥ*	*islīḥ*	L31–32	0
ṣam'ā	*ṣam'ā*	*ṣam'ā'*	A4	0
samḥ	*samḥ*			
samnah	*samnah*	*sumnah*	IK11	–
samur	*samur*	*samur*	H46–47	+
shafallaḥ	*shafallaḥ*	*shafallaḥ*	H231	+
shaḥḥūm	*shaḥḥūm*			
sha'īr	*sha'īr*	*sha'īr*	H42	+
shajarat ad-dābb	*shajarat ad-dābb*			
shajarat an-na'ām	*shajarat an-na'ām*			
sha'rān	*sha'rān*	*sha'rān*	H67	+
sharī	*shary*	*shary*	H65	+
shbēkah, shubbāk	*shubaykah, shubbāk*	*shubbāk*	H59	–
shēyyūkh	*shayyūkh*	*shayyūkh*	IK10	–
shgārā	*shiqārā*	*shuqqārá*	H68–70	+
sh/hēbā	*shuhaybā*			
shibhān	*shibhān*	*shabahān*	H62	+
shibrig	*shibriq*	*shibriq*	H60–61	–
shidd al-jamal	*shidd al-jamal*			

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
shi'ēyirah	*shu'ayyirah*	*sha'īr*	H68	–
shīḥ	*shīḥ*	*shīḥ*	H77	+
shilwah	*shilwah*			
shinān	*shinān*	*ushnān*	L41	+
shirshir, sharshīr	*shirshir, sharshīr*	*shirshir*	H65	+
shōlah	*shawlah*			
shū'	*shū'*	*shū'*	H75–76	–
shubrum	*shubrum*	*shubrum*	H61–62	–
shuwwēl	*shuwwayl*	*shuwaylā'*	H76	+
sidr	*sidr*	*sidr*	H32–33	+
ṣiffār	*ṣaffār*	*ṣaffār, ṣafrā'*	H86	+
sillaj	*sillaj*	*sullaj*	H42–43	+
ṣmēmā	*ṣumaymā'*	*ṣumaymā'*	H87–88	+
ṣullēyān	*ṣullayyān*	*ṣillayyān*	H87	0
suwwād	*suwwād*			
swēgah	*suwayqah*			
ṭaḥmā	*ṭaḥmā'*	*ṭaḥmā'*	H108	+
ṭalḥ	*ṭalḥ*	*ṭalḥ*	H111–12	+
tannūm	*tannūm*	*tannūm*	L73	+
tarbah	*tarabah*	*taribah*	L74	+
ṭarfā	*ṭarfā*	*ṭarfā'*	H110–11	+
ṭarṭē'	*ṭarṭay'*			
ṭarthūth	*ṭarthūth*	*ṭurthūth*	H108–10	+
thēmūm	*thaymūm*	*thumām*	L78–80	–
thēyyil	*thayyil*	*thayyil*	A15	+
thillēth	*thullayth*			
thmām	*thamām*	*thumām*	L78–80	+
thundā	*thundā*	*thuddā'*	L77	+
ṭirf	*ṭirf*			
ṭīṭ	*ṭīṭ*	*ṭīṭān, ṭīṭ*	H115	+
ṭubbāg	*ṭubbāq*	*ṭubbāq*	H106–7	–
tummēr	*tummayr*			
'ujērimān	*'ujayrimān*	*'ujrum*	H125–26	–
'ujram	*'ujrum*	*'ujrum*	H125–26	–

(*Continued*)

TABLE A.1. (*Continued*)

Generics				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
umm ath-thrēb	umm ath-thurayb			
umm at-trāb	*umm at-turāb*			
umm gṭēnah	*umm quṭaynah*			
'unṣēl	*'unṣayl*	*'unṣul*	H156–57	–
'ushar	*'ushar*	*'ushar*	H133–36	+
'uwēdhirān	*'uwaydhirān*	*'udhār*	A19	–
'uwēnah	*'uwaynah*			
wasal	*wasal*			
wbērah	*wubayrah*	*wabrā'*	IK14–15	0
yanam	*yanam*	*yanam*	H351–52	+
yanbūt	*yanbūt*	*yanbūt*	H349–51	+
zahr	*zahr*	*zahr*	L204–5	–
zarrī'	*zarrī'*			
zumlūg	*zumlūq*			
zwān	*zawān*	*zuwān*	L203–4	–

Intermediate Categories and Life Forms				
Present-Day Names		Ninth and Tenth Centuries A.D.	Reference	
Bedouin	Classical Transliteration			
gish'	*qish'*			
ḥamḍ	*ḥamḍ*	*ḥamḍ*	L154	+
'iḍāh	*'iḍāh*	*'iḍāh*	A23	+
'ishb	*'ushb*	*'ushb*	H133	+
khillah	*khillah*	*khullah*	L154	+
shajar	*shajar*	*shajar*	gen.	+
shima'	*shima'*			
ṭahāmīj	*ṭahāmīj*			

Appendix B

Plant Remedies Collected from Herbalists' Shops

I PURCHASED THE PLANT DRUGS listed here in herbalists' shops in eastern Saudi Arabia. Many of them were imported from other countries as part of the traditional, dhow-borne plant drug trade that has existed in the Persian Gulf and Indian Ocean for more than a millennium. Names preceded by an asterisk are plants known to be native to the desert flora of eastern Saudi Arabia, and the Bedouins' medicinal uses for them are described in section 4.4 of the main text. I follow classical Arabic transliteration style here, and because most of the terms listed are not Bedouin, they are not given in bold type.

'afṣ, Quercus sp. (Fagaceae). Oak galls. Probably used as an astringent or in tanning.

arṭā, Calligonum comosum* L'Hér. (Polygonaceae). Dried twigs. Said to be used for women's ailments. Herbalists usually used the synonym ***arṭā* for *Calligonum,* although the name ***'abal*** was more common among our southern Najdī-speaking Bedouins.

bahīlaj, Terminalia bellerica Roxb. (Combretaceae). Dried fruit, belleric myrobalans. This staple of traditional medicine in Southwest Asia is used as an astringent and a digestive (Hooper 1937, 177).

**basbās, Anisosciadium lanatum* Boiss. (Umbelliferae). Dried upper stems and fruits. Used, probably as a water extract, for skin sores and boils.

dam al-akhawayn, Dracaena cinnabari Balf. (Agavaceae). Lumps of very dark red resin generally referred to in the West (as in Arabic) as "dragon's blood." The drug is imported from the island of Socotra, off southwestern Arabia, and used as an astringent and stiptic (Hooper 1937, 114).

dayram, bark of the walnut tree, *Juglans regia* L. (Juglandaceae). Strips of walnut bark, dull reddish brown in color, generally 2–3 cm wide and 8–12 cm long, sometimes folded double. It is also sold in local spice markets and said to be used by women to cleanse the mouth and redden the lips. Shahina Ghazanfar says that in Oman walnut bark is "soaked in

water and rubbed on the teeth and gums for cleaning; it gives a reddish tinge to the gums which is found attractive" (1994, 120). She also points out that the bark is called *bambar* in Saudi Arabia, but in my study area I found that name applied only to the oasis tree, *Cordia myxa* L., the fruits of which are vermifuge according to villagers of al-Qaṭīf.

filfil mabārad, Piper retrofactum Vahl., syn. *Piper longum* L. (Piperaceae). Long pepper; dried spikes of unripe fruits. According to Armin Schopen, this spice imported from India is used in Yemen as a tonic, stimulant, and aphrodisiac (1983, 55). It is called *dār filfil* there.

ghisl, Myrtus communis L. (Myrtaceae). Myrtle, sold both as whole dried leaves and as a fine powder (from the leaves). It is used, among other things, as baby powder. Similar-appearing powder of the same name comes from *Ziziphus spina-christi* (L.) Willd., used as a shampoo and for general washing.

ḥabbah sawdā', samrā' (black seed), *Nigella sativa* L. (Ranunculaceae). Seeds. This remedy is as well known in Arabia as aspirin is in the West, and both Bedouins and villagers use it for a wide variety of ailments ranging from nasal congestion to constipation as well as (mixed with other remedies) for childbirth recovery.

ḥabb ḥarmal, Peganum harmala L. (Zygophyllaceae). Seeds. This is one of the better-known traditional drugs in southwestern Asia, where it is used to treat colic and kidney stones and as a vermifuge. The active alkaloids include harmine, harmaline, harmalol, and peganine. The seeds also have antibacterial activities (Ghazanfar 1994, 218).

halīlaj, hulayhilah, Terminalia chebula Retz. (Combretaceae). Dried fruits (black myrobalans). Found in all traditional drug shops in the Middle East, black myrobalans are used as a purge and to relieve stomach pains (Hooper 1937, 177). It is used in Oman for treating constipation, flatulence, and acid stomach (Ghazanfar 1994, 87).

ḥaltīt, Ferula assa-foetida L. (Umbelliferae). Asafetida; lumps of the oleogum resin, of very strong, somewhat unpleasant alliaceous odor. This is one of the important traditional drugs exported from Iran and neighboring regions; it is used to treat flatulence and, at least formerly, hysterical conditions (Trease 1961, 441–42).

hard, Curcuma domestica Val. or *C. longa* Trim. (Zingiberaceae). Turmeric root pieces, said to be used, after pounding to powder, for children's ailments.

ḥarmal, Peganum harmala L. (Zygophyllaceae). Dried leaves, said to be used by smoking them in a pipe. Ghazanfar reports that the leaves are used in Yemen to treat arthritic pain by rubbing on joints and that an anthelmintic tea is made from them (1994, 218). *Peganum* is called *ḥarmal* by herbalists, although most of my Bedouin consultants applied the term ***ḥarmal*** to *Rhazya stricta,* which is not botanically related to *Peganum.*

hayl ḥabashī (Abyssinian cardamom), *Amomum subulatum* Roxb. (Zingiberaceae). Hill cardamoms, the dried fruits. Said to have been imported originally from (or through) Iran and India. They are used both as a spice and as a carminative and a stimulant (Hooper 1937, 84).

ḥulbah, Trigonella foenum-graecum L. (Leguminosae). Fenugreek seeds, grown locally in oasis gardens. This well-known remedy is used in Oman to treat bronchitis and coughs and for postpartum treatments. The seeds contain a steroidal saponin, diosgenin, as well as the alkaloid trigonelline (Ghazanfar 1994, 117).

'irq al-hayl, Elettaria cardamomum Maton. (Zingiberaceae). Root pieces of the cardamom plant.

'irq al-layy, Helicteres isora L. (Sterculiaceae). Dried fruits (although called a root in the Arabic name) of characteristic twisted form from India or Sri Lanka and said to be taken with meat. David Hooper says *Helicteres* is used for dysentery and flatulence (1937, 124–25).

'irq aṣ-ṣalīb, 'irq ṣalībī, Paeonia officinalis Retz. (Paeoniaceae). Brown, spindle-shaped root tubers, somewhat porous and lighter colored within. This plant is used in Yemen under the name *'ūd aṣ-ṣalīb* (Schopen 1983, 124–25). According to Ghazanfar, the drug has been used for psychological and nervous illnesses (1994, 161). J. C. Uphof notes its use for spasms and epilepsy (1968, 381).

'irq as-sūs, Glycyrrhiza glabra L. (Leguminosae). Licorice root. It has been long used in Asia for cough and chest complaints, also to relieve "indigestion from eating fruit" (Hooper 1937, 122).

* *'ishriq, Cassia italica* (Mill.) F. W. Andr. (Leguminosae). Dried leaflets and fine stems. This senna is used as a strong purge.

iẓāfar al-jānn (fingernails of the ***jinn***), *Astragalus hamosus* L. (Leguminosae). These dried, curved pods are probably from Iran. The drug is said to be used by burning the pods and inhaling the smoke.

**ja'dah, Teucrium polium* L. (Labiatae). Dried leaves. Used as an infusion for fever.

jāwā, Styrax benzoin Dryander (Styracaceae). Crude benzoin, sold in the markets as large lumps of fragrant dark resin with whitish inclusions. It is probably used mainly as an incense but is noted in the literature for having medicinal properties as an expectorant, antiseptic, and inhalant for lung diseases.

jawz, Myristica fragrans Houtt. (Myristicaceae). Dried whole fruits of nutmeg. According to George Trease, nutmeg has been used as a carminative (1961, 261).

jawz fūfal, Areca catechu L. (Palmae). Areca (betel) nuts. The nuts contain an alkaloid, arecoline, which is active medically. Powdered nuts are used as a vermifuge for dogs (Trease 1961, 166).

kabdah, Entada gigas (L.) Fawc. et Rendle (Leguminosae). These huge seeds are remarkable and unmistakable in both size and form. Their color is described well by their Arabic name, which means "liver." They are imported from India. Hooper cites reports that these seeds were exported from India to Iran for medicinal uses, one of which was externally for back pain (1937, 117).

**kaftah, kaff maryam, Anastatica hierochuntica* L. (Cruciferae). Small dried whole plants of characteristic spheroidal shape used to make an infusion drunk to ease childbirth.

kuzbarah, Coriandrum sativum L. (Umbelliferae). Coriander seeds. Hooper reports its use to relieve headache and (as smoke) for toothache (1937, 106).

lawz baḥrī* (sea almonds), *Avicennia marina* (Forssk.) Vierh. (Verbenaceae). Dried capsules of the mangrove called ***gurm* by my Banī Hājir consultants. I identified them by comparison with my specimens of *Avicennia* collected in Tārūt Bay. They were sold in an herbalist's shop in ad-Dammām and said to be used, pounded up in milk, to "strengthen the male faculties."

lisān aṭ-ṭayr (bird's tongue), *Holarrhena antidysenterica* Wall. (Apocynaceae). A product of India.

lubān, Boswellia sacra Flueck. (Burseraceae). Frankincense: lumps and drops of the oleogum resin. It is used primarily as incense but also as a medicine; it is imported from Dhufar, southern Oman, or from the Somali coast of East Africa.

maḥlab, Prunus mahaleb L. (Rosaceae). Dried kernels (pits) of the mahaleb cherry.

maṣṭikā, Pistacia lentiscus L. (Anacardiaceae). Mastic: small, rounded pieces of gray-colored gum resin.

murr, Commiphora myrrha (Nees) Engl. (Burseraceae). Myrrh: dark-colored pieces of the oleogum resin. It is a medicinal widely used, among other things, for colds, fevers, hemorrhoids, and toothache. It is brought in from southwestern Arabia or East Africa. Myrrh is more than twice as expensive as frankincense (see *lubān*); I noted a retail price of one hundred Saudi riyals (U.S.$26.70) per kilogram in 1986.

qajarāt, Hibiscus sabdariffa L. (Malvaceae). Dried red flower parts. This material is also sold in spice markets and is used in hot water to brew a somewhat sour-tasting but refreshing reddish tea. Its presence in herbalists' shops suggests that it is also considered medicinal in some respect.

**qayṣūm, Achillaea fragrantissima* (Forssk.) Sch. Bip. (Compositae). Dammam. Dried upper stems and flowers. It was said to be used for fevers.

qurf, Punica granatum L. (Punicaceae). Dried pieces of pomegranate rind. They are said to be used for dyeing in eastern Saudi Arabia. Ghazanfar records its use in Oman for skin rashes and in Yemen to stop bleeding (1994, 179). Hooper says the rind is used as an astringent and is prescribed for dysentery (1937, 160).

qusṭ, Saussurea lappa C. B. Clarke (Compositae). Root pieces. According to Hooper, this staple of Middle Eastern traditional medicine was exported from Kashmir, India (1937, 170).

rashād, seeds of *Lepidium sativum* L. (Cruciferae). Hooper notes use of these seeds in the Middle East as a tonic, aphrodisiac, and diuretic (1937, 136).

ṣabr, Aloe perryi Baker (Liliaceae). Small, nearly black pieces of resinlike dried juice. According to Trease, *Aloe perryi* is found on the island of Socotra off southwestern Arabia and in East Africa (1961, 177). It is widely known as a purgative.

**sāf, idhkhir, Cymbopogon commutatus* (Steud.) Stapf. (or possibly *C. schoenanthus* Spreng.). Gramineae. My pharmaceutical specimen of this grass was said to have been brought in from the area of Wādī ad-Dawāsir in central Saudi Arabia. It is used as a smoke inhalant.

ṣamagh, gum of *Acacia senegal* (L.) Willd. (Leguminosae). Gum Arabic.

samm as-samak (fish poison), *Anamirta paniculata* Coleb. (Menispermaceae). Dried fruits or seeds used by the coastal people for catching fish in shallow waters of the Persian Gulf. Broken pieces are put into small

bread balls and thrown into the water. Fish that take the bait are partly paralyzed and can be collected from the water surface. I have tried it with success. According to Hooper, it is a South Asian product also used in the Orient for poisoning dogs and making skin ointments (1937, 85).

sanā makkī, ʿishriq, Cassia acutifolia Del. (Leguminosae). Senna leaves, used as a laxative.

shadhāb, Ruta chalepensis L. (Rutaceae). Broken stems and leaf pieces said to have been brought in from ʿAsīr, southwestern Saudi Arabia. It has been used to treat mental diseases and for those "possessed by devils or ***jinn***."

shayʿah, probably *Vernonia cinerascens* Sch.-Bip. (Compositae). Dried stems, leaves, and flowers. Said to have been obtained from the area of Wādī ad-Dawāsir, central Arabia. Ghazanfar notes that *V. cinerea* (L.) Less. is used in Oman to treat scorpion bites and fevers and as an anthelmintic (1994, 50).

**shīḥ, Artemisia sieberi* Besser (Compositae). Ghazanfar says that this plant is used in northern Oman as an anthelmintic and that its essential oils are reportedly toxic to the parasitic worm *Ascaris* (1994, 40).

**ṭurthūth, Cynomorium coccineum* L. (Cynomoriaceae). Dried pieces of the stalks. It is sometimes eaten as a tonic or used in dyeing to obtain a crimson color. It is also said to be used medicinally for women's complaints.

ʿunnāb, Zizyphus jujuba Mill. (Rhamnaceae). Dried fruits of the jujube. It was said to be given with sugar in the morning to treat chest complaints.

ushnān, Seidlitzia rosmarinus* Ehrenb. ex Bge. (Chenopodiaceae). Dried leaves and stem pieces crushed up in water and used as a soap substitute for washing. Bedouins use the name forms ***shinān* or ***shnān***.

washaq, Dorema ammoniacum Don (Umbelliferae). Rounded lumps of reddish brown gum resin said to be used on wounds and sores. My specimens form the characteristic milky emulsion in water described by Hooper, who says the plant is native to desert regions in Afghanistan and Iran and that it is used as a plaster for wounds and as a stimulant and expectorant (1937, 113).

I purchased pods of *Cassia fistula* L. (Leguminosae) in an herbalist shop, but I have no record of the vernacular name. According to Uphof, it is used primarily as a laxative (1968, 111).

Unidentified Medicinals

The specimens listed here, obtained from shops in al-Qaṭīf or ad-Dammām, have not yet been identified:

far'ah, broken pieces of a yellow, clearish resin with a smooth, glassy fracture. It is somewhat soluble in alcohol but not in water. It resembles pine resin, but the odor and taste of a freshly fractured piece seem too mild for that.

irm, leaves of a labiate plant, perhaps *Lavandula* (lavender), said to come from the Ḥijāz (the western, mountainous region of Saudi Arabia) and to be used mixed with *qayṣūm, Achillea frangrantissima* (Forssk.) Sch.-Bip., for treating fevers.

jift, thin, dark brown pieces of apparently tree bark mixed with broken pieces of almond-shaped seeds. It is possibly an oak bark, *Quercus* sp., and probably used for tanning or as an astringent.

mumthalah, dark brown hard nuts, somewhat of walnut shape, mostly 2–3 cm in diameter, each containing a pair of "meats" obtainable by cracking the shell. It was said to be used as an emetic. It does not fit technical descriptions of *Strychnos nux-vomica* L.

qarab, broken sections of what appear to be legume pods, very thin and flat and strongly constricted between the seeds. Possibly the pods of *Acacia nilotica* Del.

Works Cited

Abun-Nasr, Jamil M. 1987. *A History of the Maghrib in the Islamic Period*. Cambridge, U.K.: Cambridge University Press.

Allan, Tony, and Andrew Warren, eds. 1993. *Deserts: The Encroaching Wilderness*. New York: Oxford University Press.

Alsheikh, A. M., and J. M. Trappe. 1983. Desert Truffles: The Genus *Tirmania*. *Transactions of the British Mycological Society* 81:83–90.

Anderson, Myrdene. 1978. Saami Ethnoecology: Resource Management in Norwegian Lapland. Ph.D. diss., Yale University.

Arabian American Oil Company. 1979. *Aramco Meteorologic and Oceanographic Data Book for the Eastern Province Region of Saudi Arabia.* Dhahran, Saudi Arabia: Arabian American Oil Company.

Atran, Scott. 1990. *Cognitive Foundations of Natural History*. Cambridge, U.K.: Cambridge University Press.

Awameh, Mohamed S., and Abdelmagid Alsheikh. 1980. Ascospore Germination of Black Kamé *(Terfezia boudieri). Mycologia* 72:50–54.

Bagnold, R. A. [1941] 1973. *The Physics of Blown Sand and Desert Dunes*. Reprint. London: Chapman & Hall.

Basson, Philip W., John E. Burchard Jr., John T. Hardy, and Andrew R. G. Price. 1977. *Biotopes of the Western Arabian Gulf*. Dhahran, Saudi Arabia: Arabian American Oil Company.

Bergsträsser, Gotthelf. 1983. *Introduction to the Semitic Languages*. Trans. Peter T. Daniels. Winona Lake, Ind.: Eisenbrauns.

Berlin, Brent. 1992. *Ethnobiological Classification.* Princeton, N.J.: Princeton University Press.

Berlin, Brent, James Shilts Boster, and John P. O'Neill. 1981. The Perceptual Bases of Ethnobiological Classification: Evidence from Aguaruna Jívaro Ornithology. *Journal of Ethnobiology* 1:95–108.

Berlin, Brent, Dennis E. Breedlove, and Peter H. Raven. 1966. Folk Taxonomies and Biological Classification. *Science* 154:273–75.

———. 1973. General Principles of Classification and Nomenclature in Folk Biology. *American Anthropologist* 75:214–42.

———. 1974. *Principles of Tzeltal Plant Classification.* New York: Academic Press.

Berlin, Brent, and Paul Kay. 1969. *Basic Color Terms*. Berkeley and Los Angeles: University of California Press.

Blachère, Régis. 1950. Les savants Iraqiens et leurs informateurs Bédouins aux IIe–IVe siècles de L'Hégire. In *Mélanges offerts à William Marçais,* ed. L'Université de Paris, L'Institut d'Études Islamiques, 37–48. Paris: Éditions G. P. Maisonneuve.

Blau, Joshua. 1963. The Role of the Bedouins as Arbiters in Linguistic Questions and the *Mas'ala az-Zunburiyya*. *Journal of Semitic Studies* 8:42–51.

Bokhary, H. A. 1987. Desert Truffles 'Al-Kamah' of the Kingdom of Saudi Arabia: 1. Occurrence, Identification, and Distribution. *Arab Gulf Journal of Scientific Research, Series B* 5:245–54.

Brokensha, David W., D. M. Warren, and Oswald Werner, eds. 1980. *Indigenous Knowledge Systems and Development.* Lanham, Md.: University Press of America.

Brown, Cecil H. 1974. Unique Beginners and Covert Categories in Folk Biological Taxonomies. *American Anthropologist* 76:325–31.

———. 1977. Folk Botanical Life-Forms: Their Universality and Growth. *American Anthropologist* 79:317–42.

———. 1984a. *Language and Living Things*. New Brunswick, N.J.: Rutgers University Press.

———. 1984b. Life-Forms from the Perspective of *Language and Living Things*: Some Doubts about the Doubts. *American Ethnologist* 11:589–93.

———. 1985. Mode of Subsistence and Folk Biological Taxonomy. *Current Anthropology* 26:43–64.

———. 1987. The Folk Subgenus: A New Ethnobiological Rank. *Journal of Ethnobiology* 7:181–92.

———. 1995. Lexical Acculturation and Ethnobiology: Utilitarianism versus Intellectualism. *Journal of Linguistic Anthropology* 5:51–64.

Bulmer, Ralph N. H. 1974. Folk Biology in the New Guinea Highlands. *Social Science Information* 13:9–28.

Burton, Richard F. [1879] 1984. *The Land of Midian (Revisited).* 2 vols. London: C. Kegan Paul; reprint, Cambridge, U.K.: Oleander Press.

Burtt, B. L., and Patricia Lewis. 1949. On the Flora of Kuwait. I. *Kew Bulletin* 4:273–308.

Carter, Humphrey G. 1917. Some Plants of the Zor Hills, Koweit, Arabia. *Records of the Botanical Survey of India* 6:172–206.

Cheesman, R. E. 1926. *In Unknown Arabia.* London: Macmillan.

Clément, Daniel. 1995. Why Is Taxonomy Utilitarian? *Journal of Ethnobiology* 15:1–44.

Cloudsley-Thompson, J. L., and M. J. Chadwick. 1964. *Life in Deserts*. London: G. T. Foulis.

Cole, Donald Powell. 1975. *Nomads of the Nomads: The Āl Murrah Bedouin of the Empty Quarter.* Chicago: Aldine.

Cole, Donald P., and Soraya Altorki. 2000. Production and Trade in North Central Arabia: Change and Development in 'Unayzah. In *The Transformation of Nomadic Society in the Arab East,* ed. Martha Mundy and Basim Musallam, 145–59. Cambridge, U.K.: Cambridge University Press.

Conklin, Harold C. 1954. The Relation of Hanunóo Culture to the Plant World. Ph.D. diss., Yale University.

———. [1962] 1967. Lexicographical Treatment of Folk Taxonomies. Reprinted in *Problems in Lexicography*, ed. Fred W. Householder and Sol Saporta, 119–41. Bloomington: Indiana University Press.

D'Andrade, Roy. 1995. *The Development of Cognitive Anthropology*. Cambridge, U.K.: Cambridge University Press.

Dickson, H.R.P. 1951. *The Arab of the Desert: A Glimpse into Badawin Life in Kuwait and Sau'di* [*sic*] *Arabia.* 2d ed. London: George Allen & Unwin.

Dickson, Violet. 1955. *The Wild Flowers of Kuwait and Bahrain.* London: George Allen & Unwin.

Di Meglio, R. 1978. Banū Khālid. In *The Encyclopaedia of Islam, New Edition,* 4:925. Leiden: E. J. Brill.

Doughty, Charles M. 1936. *Travels in Arabia Deserta*. 2 vols. London: Jonathan Cape.

Dymock, William, C.J.H. Warden, and David Hooper. [1890–91] 1976. *Pharmacographia Indica: A History of the Principal Drugs of Vegetable Origin, Met with in British India*. 3 vols. London: Kegan Paul, Trench, & Trübner; reprint, Delhi: Bishen Singh Mahendra Pal Singh and Periodical Experts.

Ellen, Roy. 1986. Ethnobiology, Cognition, and the Structure of Prehension: Some General Theoretical Notes. *Journal of Ethnobiology* 6:83–98.

———. 1993. *The Cultural Relations of Classification*. Cambridge, U.K.: Cambridge University Press.

Ferdinand, Klaus. 1993. *Bedouins of Qatar*. London: Thames and Hudson.

Fleisch, Henri. 1961. *Traité de philologie arabe*. Vol. 1. Beirut: Imprimerie Catholique.

Frake, Charles O. 1961. The Diagnosis of Disease among the Subanun of Mindanao. *American Anthropologist* 63:113–32.

———. 1962. The Ethnographic Study of Cognitive Systems. In *Anthropology and Human Behavior,* ed. Thomas Gladwin and William C. Sturtevant, 72–93. Washington, D.C.: Anthropological Society of Washington.

Fück, Johann. 1955. *'Arabīya, recherches sur l'histoire de la langue et du style arabe.* Trans. Claude Denizeau. Paris: Librairie Marcel Didier.

Gauthier-Pilters, Hilde. 1961. Observations sur l'écologie du Dromadaire dans le Sahara Nord-Occidental. *Mammalia* 25:195–280.

———. 1965. Observations sur l'écologie du Dromadaire dans l'Ouest du Sahara. *Bulletin Institut Fondamental Afrique Noire, Ser. A* 27:1534–608.

Gauthier-Pilters, Hilde, and Anne Innis Dagg. 1981. *The Camel: Its Evolution, Ecology, Behavior, and Relationship to Man.* Chicago: University of Chicago Press.

Ghazanfar, Shahina A. 1994. *Handbook of Arabian Medicinal Plants.* Boca Raton, Fla.: CRC Press.

Al-Ghunaym, 'Abd Allah Yūsuf, ed. 1972. *Kitāb an-nabāt 'an Abī Sa'īd 'Abd al-Malik bin Qurayb al-Aṣma'ī* (The Book of Plants by Abū Sa'īd 'Abd al-Malik bin Qurayb al-Aṣma'ī). Arabic text. Cairo: Maktabat al-Mutanabbī.

Gilmore, Melvin R. 1932. Importance of Ethnobotanical Investigation. *American Anthropologist* 34:320–27.

Groom, Nigel. 1981. *Frankincense and Myrrh.* London: Longman.

Hamidullah, Muhammad, ed. 1973. *Kitāb an-nabāt li-Abī Ḥanīfah Aḥmad Da'ūd bin Wanand ad-Dīnawarī al-mutawaffá 282 h.: Al-qism ath-thānī min al-qāmūs an-nabātī, ḥurūf sīn-yā* [The Book of Plants of Abū Ḥanīfah Aḥmad Da'ūd bin Wanand ad-Dīnawarī, d. 282 A.H.: The Second Part of the Botanical Dictionary, Letters sīn–yā]. Arabic text. Cairo: Institut Français d'Archéologie Orientale du Caire.

Hardy, A. D., H. H. Sutherland, and R. Vaishnav. 2002. A Study of the Composition of Some Eye Cosmetics (Kohls) Used in the United Arab Emirates. *Journal of Ethnopharmacology* 80:137–45. Abstract on Web site PubMed, National Library of Medicine, at http://www.ncbi.nlm.nih.gov/pubmed/12007703.

Hardy, A. D., R. Vaishnav, S. S. Al-Kharusi, H. H. Sutherland, and M. A. Worthing. 1998. Composition of Eye Cosmetics (Kohls) Used in Oman. *Journal of Ethnopharmacology* 60:223–34. Abstract on Web site PubMed, National Library of Medicine, at http://www.ncbi.nlm.nih.gov/pubmed/9613836.

Harshberger, J. W. 1896. The Purposes of Ethno-botany. *Botanical Gazette* 21:146–54.

Hays, Terence E. 1982. Utilitarian/Adaptionist Explanations of Folk Biological Classification: Some Cautionary Notes. *Journal of Ethnobiology* 2:89–94.

Headland, Thomas N. 1983. An Ethnobotanical Anomaly: The Dearth of Binomial Specifics in a Folk Taxonomy of a Negrito Hunter-Gatherer Society in the Philippines. *Journal of Ethnobiology* 3:109–20.

Heine, Bernd, and Matthias Brenzinger. 1988. *Plant Concepts and Plant Use. Part IV, Plants of the Borana (Ethiopia and Kenya)*. Saarbrücken, Germany: Breitenbach.

Heine, Bernd, and Ingo Heine. 1988a. *Plant Concepts and Plant Use. Part I, Plants of the Chamus (Kenia)*. Saarbrücken, Germany: Breitenbach.

———. 1988b. *Plant Concepts and Plant Use. Part III, Rendille Plants (Kenya).* Saarbrücken, Germany: Breitenbach.

Heine, Bernd, Ingo Heine, and Christa König. 1988. *Plant Concepts and Plant Use. Part V, Plants of the Samburu (Kenya)*. Saarbrücken, Germany: Breitenbach.

Herskovits, Melville J. 1926. The Cattle Complex in East Africa. *American Anthropologist* 28:230–72, 361–88, 494–528, 633–64.

Hobbs, Joseph J. 1989. *Bedouin Life in the Egyptian Wilderness*. Austin: University of Texas Press.

Hooper, David. 1937. *Useful Plants and Drugs of Iran and Iraq*. Chicago: Field Museum of Natural History.

Hulme, M., R. Marsh, and P. D. Jones. 1992. Global Changes in a Humidity Index Between 1931–60 and 1961–90. *Climate Research* 2:1–22.

Hunn, Eugene S. 1976. Toward a Perceptual Model of Folk Biological Classification. *American Ethnologist* 3:508–24.

———. 1977. *Tzeltal Folk Zoology*: *The Classification of Discontinuities in Nature*. New York: Academic Press.

———. 1982. The Utilitarian Factor in Folk Biological Classification. *American Anthropologist* 84:830–47.

———. 1999. Size as Limiting the Recognition of Biodiversity in Folkbiological Classifications: One of Four Factors Governing the Cultural Recognition of Biological Taxa.

In *Folk Biology*, ed. Douglas L. Medin and Scott Atran, 47–69. Cambridge, Mass.: MIT Press.

Hunn, Eugene S., and David H. French. 1984. Alternatives to Taxonomic Hierarchy: The Sahaptin Case. *Journal of Ethnobiology* 4:73–92.

Huschke, R. E., R. R. Rapp, and C. Schutz. 1970. *Meteorological Aspects of Middle East Water Supply*. Santa Monica, Calif.: RAND Corporation.

Ibn Khaldūn, ʻAbd ar-Raḥmān ibn Muḥammad. N.d. *Muqaddimatu al-ʻAllāmati Ibn Khaldūn* (The Prolegomena of Ibn Khaldūn). Arabic text. Cairo: Maṭbaʻtu Muṣṭafā Muḥammad.

Ingham, Bruce. 1993. Muṭayr. In *The Encyclopaedia of Islam, New Edition,* 7:782–83. Leiden: E. J. Brill.

———. 1994. *Najdi Arabic, Central Arabian*. Amsterdam: John Benjamins.

———. 1997. *Arabian Diversions: Studies on the Dialects of Arabia.* Reading, U.K.: Ithaca Press.

Jacobi, Renate. 1995. Rāwī. In *Encyclopaedia of Islam, New Edition* 2:466–67. Leiden: E. J. Brill.

Julien, Charles-André. 1970. *History of North Africa: Tunisia, Algeria, Morocco*. London: Routledge & Kegan Paul.

Kanovsky, Eliyahu. 1994. *The Economy of Saudi Arabia: Troubled Present, Grim Future*. Washington, D.C.: Washington Institute for Near East Policy.

Khazanov, Anatoly M. 1994. *Nomads and the Outside World*. 2d ed. Madison: University of Wisconsin Press.

Kirby, C. P. 1968. *East Africa: Kenya, Uganda, and Tanzania.* London: Ernest Benn.

Kopf, L. 1955. Review of Bernhard Lewin, ed., *The Book of Plants of Abū Ḥanīfa ad-Dīnawarī, Part of the Alphabetical Section (alif–zay)*. *Oriens* 8:146–51.

Kurpershoek, P. Marcel. 1994. *Oral Poetry and Narratives from Central Arabia I: The Poetry of ad-Dindān.* Leiden: Brill.

———. 1999. *Oral Poetry and Narratives from Central Arabia III: Bedouin Poets of the Dawāsir Tribe*. Leiden: Brill.

Kürschner, Harald. 1998. Biogeography and Introduction to the Vegetation. In *Vegetation of the Arabian Peninsula*, ed. Shahina A. Ghazanfar and Martin Fisher, 63–98. Dordrecht: Kluwer Academic.

Lammens, Henri. 1914. *Le berceau de l'Islam: L'Arabie Occidentale à la veille de l'Hégire*. Rome: Sumptibus Pontificii Instituti Biblici.

Lancaster, William. 1997. *The Rwala Bedouin Today*. 2d ed. Prospect Heights, Ill.: Waveland Press.

Lancaster, William, and Fidelity Lancaster. 1999. *People, Land, and Water in the Arab Middle East: Environments and Landscapes in the Bilād ash-Shām*. Amsterdam: Harwood Academic.

Lane, Edward William. [1863–93] 1968. *An Arabic–English Lexicon*. 8 vols. Reprint. Beirut: Librairie du Liban.

Lebling, Robert W., and Donna Pepperdine. 2006. *Natural Remedies of Arabia*. London: Stacey International.

Lee, Richard Borshay. 1979. *The !Kung San: Men, Women, and Work in a Foraging Society*. Cambridge, U.K.: Cambridge University Press.

Leese, A. S. ca. 1927. *A Treatise on the One-Humped Camel*. Stamford, U.K.: Haynes & Son.

Lévi-Strauss, Claude. 1966. *The Savage Mind.* Chicago: University of Chicago Press.

Lewin, Bernhard, ed. 1953. *The Book of Plants of Abū Ḥanīfa ad-Dīnawarī, Part of the Alphabetical Section (alif–zay)*. Arabic text. Uppsala, Sweden: A. B. Lundequistska Bokhandeln.

———, ed. 1974. *The Book of Plants, Part of the Monograph Section, by Abū Ḥanīfa ad-Dīnawarī*. Arabic Text. Wiesbaden, Germany: Franz Steiner Verlag.

Littman, Enno. 1926. Zwei seltenere arabische Nominalbildungen (*qaitūl* und *quttail*). *Zeitschrift für Semitistik und verwandte Gebiete* 4:24–41.

Mabberley, D. J. 1987. *The Plant-Book*. Cambridge, U.K.: Cambridge University Press.

Macdonald, D. B. 1953. Djinn. In *Shorter Encyclopaedia of Islam*, ed. H.A.R. Gibb and J. H. Kramers, 90–91. Leiden: E. J. Brill.

Malinowski, Bronislaw. 1948. *Magic, Science, and Religion and Other Essays.* Glencoe, Ill.: Free Press.

Mandaville, James P. 1963. Thāj: A Pre-Islamic Site in Northeastern Arabia. *Bulletin of the American Schools of Oriental Research* 172:9–20.

———. 1965a. Bedouin Settlement in Saudi Arabia: Its Effect on Company Operations. Typescript report for the Arabian American Oil Company, Dhahran, Saudi Arabia.

———. 1965b. Plants Eaten by *Uromastix microlepis* Blanford and Other Notes on This Lizard in Eastern Arabia. *Journal of the Bombay Natural History Society* 62:161–63.

———. 1984. Studies in the Flora of Arabia XI: Some Historical and Geographical Aspects of a Principal Floristic Frontier. *Notes from the Royal Botanic Garden Edinburgh* 42:1–15.

———. 1990. *Flora of Eastern Saudi Arabia*. London: Kegan Paul International.

Martin, Gary J. 1995. *Ethnobotany: A Methods Manual*. London: Chapman & Hall.

Matthews, C. D. 1960. Bedouin Life in Contemporary Arabia. *Rivista degli Studi Orientali* 35:31–61.

McClure, Harold A. 1984. Late Quaternary Palaeoenvironments of the Rub‘ al-Khali. Ph.D. diss., University of London.

McGinnies, William G. 1988. Climatic and Biological Classification of Arid Lands: A Comparison. In *Arid Lands Today and Tomorrow,* ed. Emily E. Whitehead, Charles F. Hutchinson, Barbara N. Timmermann, and Robert G. Varady, 61–68. Boulder, Colo.: Westview Press.

Miller, Anthony G., and Miranda Morris. 1988. *Plants of Dhofar: The Southern Region of Oman, Traditional, Economic, and Medicinal Uses*. Muscat, Oman: Office of the Adviser for Conservation of the Environment.

Monteil, Vincent, and Charles Sauvage. 1949. *Contribution à l'étude de la flore du Sahara Occidental*. Paris: Éditions Larose.

Morris, Brian. 1984. The Pragmatics of Folk Classification. *Journal of Ethnobiology* 4:45–60.

Moscati, Sabatino. 1964. *An Introduction to the Comparative Grammar of the Semitic Languages.* Wiesbaden, Germany: Otto Harrassowitz.

Mossa, Jaber Salem, Mohammed Abdulaziz Al-Yahya, and Ibrahim Abdulrahman Al-Meshal. 1987. *Medicinal Plants of Saudi Arabia*. Vol. 1. Riyadh: King Saud University Libraries.

Musil, Alois. 1926. *The Northern Ḥeğâz*: *A Topographical Itinerary.* New York: American Geographical Society.

———. 1927. *Arabia Deserta*: *A Topographical Itinerary*. New York: American Geographical Society.

———. 1928a. *The Manners and Customs of the Rwala Bedouins*. New York: American Geographical Society.

———. 1928b. *Northern Neğd: A Topographical Itinerary.* New York: American Geographical Society.

Nagelberg, Samuel, ed. 1909. *Kitâb aš-šağar: Ein botanishes Lexikon zum ersten Male nach einer Berliner Handschrift ediert, mit Einleitung und kritischen und erörternden Anmerkungen versehen*. Arabic text. Kirchhain, Germany: Max Schmersow.

Nicolaisen, Johannes. 1963. *Ecology and Culture of the Pastoral Tuareg*. Copenhagen: National Museum of Copenhagen.

Osborn, Dale J. 1968. Notes on Medicinal and Other Uses of Plants in Egypt. *Economic Botany* 22:165–77.

Palgrave, William Gifford. 1865. *Narrative of a Year's Journey Through Central and Eastern Arabia.* 2 vols. London: Macmillan.

Peck, E. F. 1939. Salt Intake in Relation to Cutaneous Necrosis and Arthritis of One-Humped Camels (*Camelus dromedarius,* L.) in British Somaliland. *Veterinary Record* 51:1355–360.

Philby, Harry St. John Bridger. 1922. *The Heart of Arabia*. 2 vols. London: Constable.

———. 1928. *Arabia of the Wahhabis*. London: Constable.

———. 1933. *The Empty Quarter*. London: Constable.

———. 1955. *Saudi Arabia*. London: Ernest Benn.

Powers, R. W., L. F. Ramirez, C. D. Redmond, and E. L. Elberg Jr. 1966. *Geology of the Arabian Peninsula: Sedimentary Geology of Saudi Arabia.* Geological Survey Professional Paper 560-D. Washington, D.C.: U.S. Government Printing Office.

Quézel, P., and S. Santa. 1962–63. *Nouvelle flore de l'Algérie et des régions désertiques méridionales*. 2 vols. Paris: Centre National de la Recherche Scientifique.

Randall, Robert A. 1987. The Nature of Highly Inclusive Folk-Botanical Categories. *American Anthropologist* 89:143–46.

Randall, Robert A., and Eugene S. Hunn. 1984. Do Life-Forms Evolve or Do Uses for Life? Some Doubts about Brown's Universals Hypotheses. *American Ethnologist* 11:329–49.

Reitan, Clayton R., and Christine R. Green. 1968. Weather and Climate of Desert Environments. In *Deserts of the World: An Appraisal of Research into Their Physical and Biological Environments,* edited by William G. McGinnies, Bram J. Goldman, and Patricia Paylore, 19–92. Tucson: University of Arizona Press.

Rentz, George. 1951. Notes on Dickson's *The Arab of the Desert*. *The Muslim World* 41:49–64.

———. 1957. Notes on Oppenheim's *Die Bedouinen*. *Oriens* 10:77–89.

———. 1960. Djazīrat al-'Arab. In *The Encyclopaedia of Islam, New Edition,* 1:533–56. Leiden: E. J. Brill.

———. 1965. Al-Dawāsir. In *The Encyclopaedia of Islam, New Edition,* 2:175–77. Leiden: E. J. Brill.

Rentz, George, and William Mulligan. 1950. *The Eastern Reaches of al-Hasa Province*. Dhahran, Saudi Arabia: Arabian American Oil Company.

Schmidt-Nielsen, Knut. 1964. *Desert Animals: Physiological Problems of Heat and Water.* Oxford, U.K.: Clarendon Press.

Schopen, Armin. 1983. *Traditionelle Heilmittel in Jemen*. Wiesbaden, Germany: Franz Steiner.

Serjeant, R. B. 1968. Fisher-Folk and Fish-Traps in Al-Baḥrain. *Bulletin of the School of Oriental and African Studies* 31:486–514.

Smith, W. Robertson. [1894] 1956. *The Religion of the Semites*. 2d ed. Reprint. New York: Meridian Books.

Spencer, Paul. 1973. *Nomads in Alliance: Symbiosis and Growth among the Rendille and Samburu of Kenya*. London: Oxford University Press.

Sprenger, A. 1891. Versuch einer Kritik von Hamdânis Beschreibung der arabischen Halbinsel und einige Bemerkungen über Professor David Heinrich Müller's Ausgabe derselben. *Zeitschrift der Deutschen Morgenländischen Gesellschaft* 45:361–94.

Sturtevant, William C. 1964. Studies in Ethnoscience. *American Anthropologist* 66, no. 3, pt. 2: 99–131.

Täckholm, Vivi. 1974. *Students' Flora of Egypt.* 2d ed. Cairo: Cairo University.

Thesiger, Wilfred. 1949. A Further Journey across the Empty Quarter. *Geographical Journal* 113:21–46.

———. 1950–51. *Desert Borderlands of Oman.* London: Royal Geographical Society. Reprinted from two articles that appeared in *Geographical Journal* 116, nos. 4–6, and 117, pt. 1.

———. 1959. *Arabian Sands*. London: Longmans.

Thomas, Bertram. 1932. *Arabia Felix: Across the Empty Quarter of Arabia*. London: Jonathan Cape.

Thornthwaite, C. W. 1948. An Approach toward a Rational Classification of Climate. *Geographical Review* 38:55–94.

Trease, George Edward. 1961. *A Textbook of Pharmacognosy*. 8th ed. London: Baillière, Tindall and Cox.

United Nations Education, Scientific, and Cultural Organization (UNESCO). 1960. *Medicinal Plants of the Arid Zones (Arid Zone Research XIII).* Paris: UNESCO.

United Nations Environment Program (UNEP). 1992. *World Atlas of Desertification.* London: Edward Arnold.

———. 1997. *World Atlas of Desertification.* 2d ed. London: Arnold.

Uphof, J. C. Th. 1968. *Dictionary of Economic Plants.* Lehre, Germany: J. Cramer.

Verdcourt, Bernard, and E. C. Trump. 1969. *Common Poisonous Plants of East Africa.* London: Collins.

Versteegh, Kees. 1997. *The Arabic Language.* New York: Columbia University Press.

Vesey-Fitzgerald, Desmond. 1957. The Vegetation of Central and Eastern Arabia. *Journal of Ecology* 45:779–98.

Vidal, F. S. 1955. *The Oasis of al-Hasa.* Dhahran, Saudi Arabia: Arabian American Oil Company.

Waddy, Julie Anne. 1988. *Classification of Plants & Animals from a Groote Eylandt Aboriginal Point of View*. 2 vols. Darwin: Australian National University.

Wallén, C. C. 1966. Arid Zone Meteorology. In *Arid Lands: A Geographical Appraisal*, ed. E. S. Hills, 31–51. London: Methuen.

Wierzbicka, Anna. 1984. Apples Are Not a "Kind of Fruit": The Semantics of Human Categorization. *American Ethnologist* 11:313–28.

———. 1985. *Lexicography and Conceptual Analysis*. Ann Arbor, Mich.: Karoma.

———. 1996. *Semantics: Primes and Universals.* Oxford, U.K.: Oxford University Press.

Williams, J. T., and R. M. Farias. 1972. Utilisation and Taxonomy of the Desert Grass *Panicum turgidum*. *Economic Botany* 26:13–20.

Wilson, R. T. 1984. *The Camel.* London: Longman.

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Index of Scientific Plant Names

Bold page numbers indicate main entries with technical plant descriptions, vernacular names, and references to CD photos.

About the Author

James Mandaville resided in Saudi Arabia for most of his life. His early work there for the Arabian American Oil Company (now the Saudi Arabian Oil Company) included research in tribal lore and geographical names for mapping programs and research on international boundaries. His interest in desert plant life and Bedouin plant nomenclature led to his extensive specimen collections for the Natural History Museum, London, and other herbaria. His publications include *Flora of Eastern Saudi Arabia* (1990) and numerous monographs on Arabian floristics and plant geography. As an undergraduate, he majored in Arabic at Georgetown University. His Ph.D. was in arid lands resource sciences at the University of Arizona, and he has worked as a consultant for a rangeland restoration project in Saudi Arabia. His other interests include trail riding on his Arabian horse, Sharīf; building and operating an amateur radio station; and applying experimental electronics to geophysics, solar astronomy, and natural radioactivity. He also recently began taking lessons on the cello, which he describes as “properly humbling.”

"This is by far the best and most thorough account of mainland Arabian ethnobotany. Mandaville's work brings new sophistication to studies of Middle Eastern ethnoscience."

—E. N. Anderson, co-author of *Political Ecology in a Yucatec Maya Community*

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